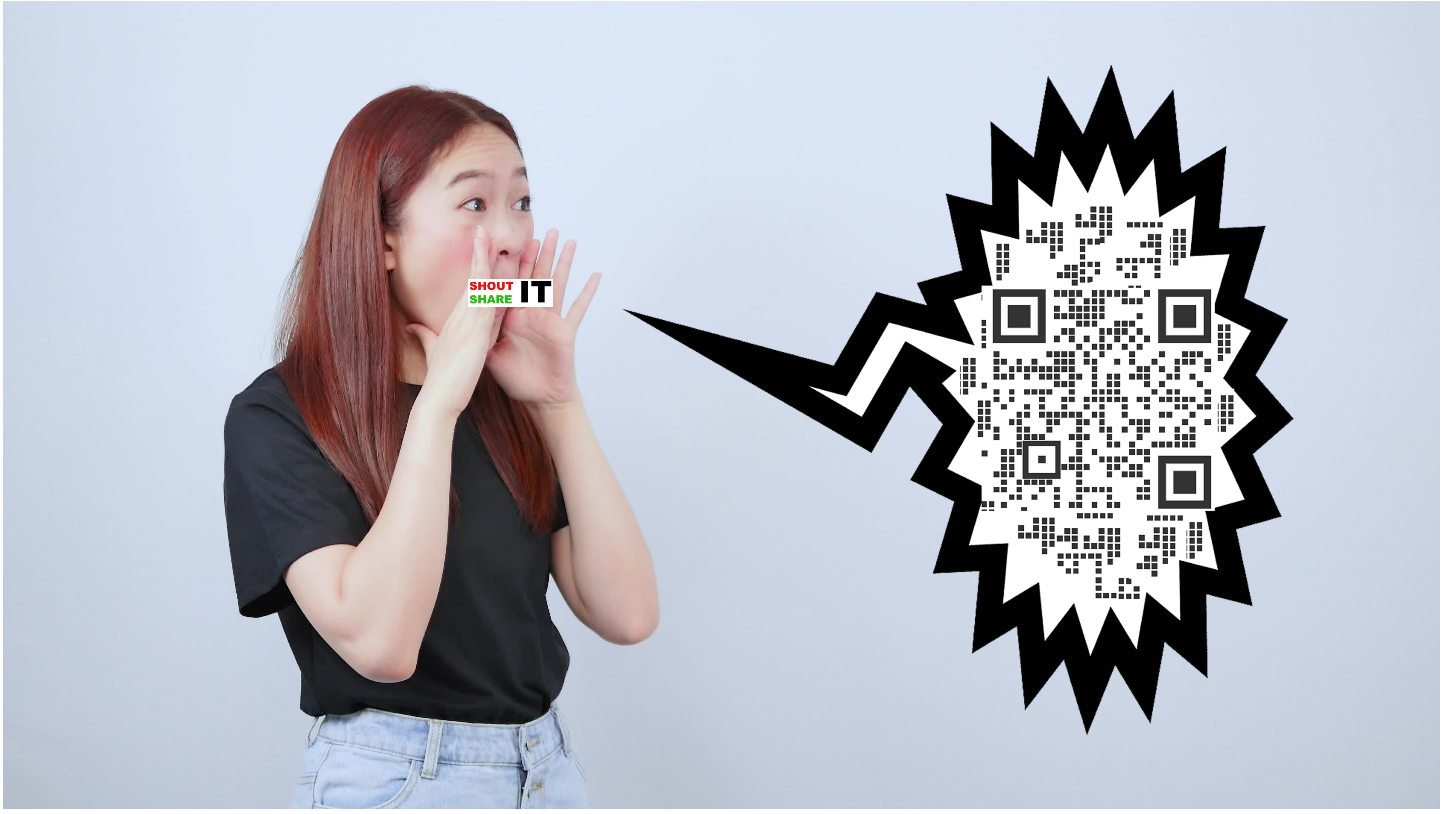
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THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

REPORT FOR 1933

(WITH BALANCE-SHEET FOR 1933),

BY THE

SECRETARY,

WILLIAM HARRISON PEARSALL,

GREEN GABLE, MATFIELD, KENT.

VOL. X. PART III.

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THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

(VOL. X. PART III.).

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The Ordinary Member's Subscription of 10/- per annum (or Exchange Member's 20/-) should be paid on or soon after January 1, 1934, to the Assistant Secretary, Mr JOHN F. G. CHAPPLE, Yardley Lodge, 9 Crick Road, Oxford.

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THE

BOTANICAL SOCIETY & EXCHANGE CLUB OF THE BRITISH ISLES.

BALANCE-SHEET FOR 1933.

Balance from Balance-Sheet for 1932, - -	£305	8	8	Printing Reports (and carriages, &c., connected),	£249	8	10
Less Subscriptions paid in advance in 1932, - -	48	16	6	Expenses of Distribution, -	1	13	0
	£256	12	2	Critics, &c., - £4 18 3 *Less* Donation from H. Phillips, Esq., 3 0 0	1	18	3
Subscriptions for 1933, -	241	8	0	Postages, Stationery, and Petty Expenditure generally (Secy., & Ass. Secy.),	25	3	10
,, paid in advance,	68	4	0	One Year's Allowance to Secretary, - - -	50	0	0
Sales of Reports, Reprints, and Advertisements, -	8	8	9	Honorarium to Ass. Secy.,	40	0	0
Deposit Interest, - - -	0	9	7	Insurance (1932 & 1933), -	0	12	0
				Cheque Stamps, - -	0	4	4
				Balance, - - - -	206	2	3
	£575	2	6		£575	2	6

PUBLICATIONS ACCOUNT.

Balance from Balance Sheet for 1932, -	£57	19	7	Binding, - - - -	£0	17	9
Sales of Comital Flora. -	25	5	6	Balance, - - - -	91	17	6
Sales of Flora Northants,	2	1	7				
Sales of British Plant Lists.	7	8	7				
	£92	15	3		£92	15	3

BALANCES OF FUNDS.

Balance from General A/c..	£206	2	3	National Savings Certificates, at cost, -	£256	16	0
Balance from Publications Account, - - -	91	17	6	National Savings Certificates, at cost, - -	143	4	0
Balance from Life Members' Fund, £109 1 0 One New Life Member, - - 7 7 0	116	8	0	Balance in Bank, 18th Dec., 1933, - - - -	62	12	3
Balance from Miss Trower's Fund, - - - -	16	7	11	Cash in hand, - - -	9	6	11
Balance from Benevolent Fund,	41	3	6				
	£471	19	2		£471	19	2

(Signed) Thomas J. Foggitt, } *Honorary Treasurers.*
,, Gertrude Foggitt, }
,, John Chapple, *Assistant Secretary.*

15th January 1934.— Examined and found correct.

(Signed) F. A. Bellamy, M.A., F.R.A.S.

SECRETARY'S REPORT.

The previous Report was very cordially received and I must at the outset express my gratitude to all those who so willingly contributed to make it so generally appreciated. As the first number of a new volume issued under changed conditions it was necessary that it should include a wide range of subjects indicating directions in which future work is desirable and interest is already aroused. It was also imperative that it should again emphasise the need for accuracy and completeness in all records of the distribution of British plants, otherwise they are valueless as the basis of further generalisations. Further, our membership includes such different types of individual scientific attainment, that our Reports must include both highly critical articles and others that are elementary and educative. In addition they must afford the most valuable and authentic records of the present distribution of British plants available and must afford space for necessary corrections of errors or omissions in the past records of the same.

As the result of keeping all the foregoing aims in view the Report became unduly bulky and expensive but achieved the objects intended by its publication. Among the papers contributed pathetic interest attaches to those by the late Dr Eric Drabble and W. F. Miller as being the last those able botanists were able to write.

The present Report follows much the same lines as the last and we trust that every member will find in its pages something of personal interest and stimulus. During the past year we have made some progress toward securing Local Secretaries for given areas and a list of those already appointed will be found herein. The Annual Conversazione on November 15, 1933, was a great success in every way. The members of the two societies got to know each other more intimately and were afforded opportunities of obtaining information or advice and of discussing matters of common botanical interest with others. We are again very greatly indebted to Mrs Gertrude Foggitt for her untiring efforts to make the occasion so thoroughly enjoyable. The date of the next Conversazione has been fixed for Wednesday, 14th of November 1934.

It may not be generally known that this Society takes the greatest interest in plant preservation and is represented on the Wild Plant Conservation Board. During the past year the Board has given much time to the consideration of such matters as the undue trimming of roadside herbage, county bye-laws for the protection of wild plants—and legislation for the same—and the danger to the flora of particular districts through road alterations, golf-courses or building. There may be some members who find it difficult to reconcile our zeal for plant protection with our annual distribution of plants for exchange. In regard to the latter the rule " No specimens of any rare plant should be gathered if its existence in that habitat might thereby be endangered " is most honourably observed by our collecting members. Further, it is not generally known that the first charge on the plants sent in for distribution is the supply of specimens of each species to the great national herbaria at the British Museum and Kew. There are so many questions which can only be answered by the study of extensive systematic collections of plants that we are bound to collect all the evidence possible.

With a view to affording further opportunities for field-work, a series of excursions to places of botanical interest has been arranged—a list of which has already been sent out—and it is hoped that these will be well attended. We are much indebted to all those who have worked so hard to make the necessary arrangements to ensure the success of these gatherings.

Our financial position continues to be extremely satisfactory and members will be glad to know that 35 new members have joined the Society since the issue of the last Report. A list of their names and addresses is appended.

For many years it has been felt that our Reports should be published earlier in the year so as to be of use in the same year's field-work. Many attempts were made by Dr Druce to achieve this desirable result but inevitably many articles, records, and other contributions were received while the Report was going through the press and publication was thereby delayed. It seems to us that the whole difficulty lies in the fact that nobody has ever known the last date upon which MS. will be received. We propose, therefore, to suggest that all Records should be in by December 31st. As each record has to be card-indexed it would save much time and labour if members would use cards 12.5 × 7.5 cm., and on each write (1) The number according to the Oxford List, (2) the name of the plant, (3) the locality, giving the vice-county, (4) any additional note of scientific interest, (5) collector's name. As no record can be published without the name or number of the vice-county in which the plant was found, failure to give this information in the case of some obscure locality has frequently caused much arduous and unnecessary research.

As regards MS. *the latest late upon which any can be received is March 31st* in each year. As a general rule it is well to send in articles, papers or other lengthy contributions before the preceding December 31st. We trust members will co-operate in all such efforts to ensure earlier publication of the Report.

Altogether apart from the value of the Society's publications is that of its correspondence. Members are invited to submit any of their botanical difficulties to the Secretary, who assures them that he is always delighted to render any assistance in his power. Although the bulk of this correspondence is with members working at a distance from adequate library or herbarium facilities and yields little or no material for publication, its educational and social value is very considerable and should be taken into account in estimating the value of the Society's work. In this connection we are deeply grateful for the very willing and invaluable co-operation of all those who have rendered assistance in the critical examination of British plants. Among foreign botanists we are indebted to Prof. O. E. Schulz, Dr K. Ronniger, Dr Almquist, Dr P. Aellen, Prof. B. H. Danser, Dr H. Dahlstedt, Dr F. Jaquet, Dr R. Probst, Dr K. H. Zahn, Dr H. Schinz, Prof. J. Holmboe and Dr G. Kükenthal. To the authorities of the Royal Botanic Gardens at Kew and of the British Museum at Cromwell Road we tender our sincerest thanks for much kindly advice and ready assistance in many instances. Among British botanists we are deeply appreciative of kindness shown by Mr A. J. Wilmott, Mr J. S. L. Gilmour, Dr W. B. Turrill, Dr T. A. Sprague, Mr A. B. Jackson, Mr George Taylor, Mr A. D. Cotton, Mr Noel Sandwith, Lt.-Col. A. H. Wolley-Dod, Rev. H. J. Riddelsdell, Mr W. C. Barton, Mr E. B. Bishop, Mr H. W. Pugsley, Mr W. O. Howarth, Mr P. M. Hall, Dr W. A. Sledge, Mr J. Fraser, Mr C. E. Britton, Mr A. E. Wade, Dr R. W. Butcher, Dr F. W. Stansfield, Mrs H. Drabble and Miss G. Wigglesworth.

NEW MEMBERS.

Mr A. W. Anderson, Curator, Gardens and Parks, Timaru, New Zealand.
Mr F. T. Baker, Assistant Curator, City and County Museum, Lincoln.
Mr W. H. Blyth Martin, Taymouth, Dundee.
Mr J. P. M. Brennan, Cape Cottage, Tonbridge, Kent.
The Hon. Guy Charteris, 24 Oxford Square, London, W.2.
The Rev. G. H. Chilman, Dalton Parsonage, Thirsk, Yorkshire (1934).
Mrs Philippa German, Newlands, The Plantation, Darrington, Worthing, Sussex (1934).
The Viscountess Gladstone, 27 Chester Terrace, London, S.W.1 (1934).
Miss B. Gullick, B.Sc., Crane Bridge Road, Salisbury.
Miss May Heron, Erclands, Ercall Lane, Wellington, Salop (1934).
Mr S. Ashton Hill, Hillfields, Bewdley, Worcestershire.
Department of Botany, University College, Hull.
Mr Francis Jekyll, Munstead House, Godalming, Surrey (1934).
Mr Rex Knowling, Hertford College, Oxford (1934).
Mr E. D. Morgan, South View, School Lane, Crowborough, Sussex.
Mr E. Nelmes, The Herbarium, Royal Botanic Gardens, Kew, Surrey (1934).
Mrs J. Vandeleur Phelps, Woodbury, East Avenue, Bournemouth (1934).
The Rev. G. C. Pownall, "Norman Dene," Charlton Kings, Cheltenham (1934).
Mr Cecil T. Prime, B.A., Whitgift School, Haling Park, Croydon, Surrey (1934).
Mrs L. Samuels, Quarry Bank House, Styal, via Manchester.

Mr A. L. Still, B.A., Roslyn, Dower Avenue, Wallington, Surrey (1934).
Mr G. Taylor, B.Sc., British Museum (Nat. Hist.), Cromwell Road. S.W.7.
Mr H. Stuart Thompson, A.L.S., 11 Buckingham Place, Clifton. Bristol.
Mrs R. M. Tristram, F.L.S., Cox's Mill, Dallington, Sussex (1934).
Mr A. J. Wilmott, M.A., F.L.S., British Museum (Nat. Hist.), Cromwell Road, S.W.7.
Miss Lucy Burton, Stott Park, Lake Side, Ulverston, Lancs.
Mr Ronald Burn, Whatfield Rectory, Ipswich.
Miss A. M. Cory, Fullerton Manor, Andover, Hants (1934).
Mrs R. S. K. Eyre, Woodside, Crowborough, Sussex.
Miss G. Wotherspoon, Mount Ephraim Mansion, Tunbridge Wells, Kent.
Rev. A. J. Young, Seamark, Lloyd Road, Hove, Sussex.
Mrs Hugh Willan, Ladies' Empire Club, 69 Grosvenor Street, London, W.1.
Miss Ruth Yeoman, The Green, Brompton, Northallerton.
Mr W. E. Warren, "Selborne," Horsell Rise, Horsell, Surrey.
Godalming Nat. Hist. Society. E. B. Bishop, Lindfield, Marshall Road.

LOCAL SECRETARIES.

Carnarvonshire. Norman Woodhead, Esq., M.Sc., University College of N. Wales, Bangor.
Yorkshire, N. Riding. Miss C. M. Rob, Catton Hall, Thirsk, Yorks.
Lincolnshire. F. T. Baker, Esq., City and County Museum, Lincoln.
Essex. Miss M. S. Campbell, Layer Marney Hall, Kelvedon, Essex.
Glamorgan. Miss Eleanor Vachell, 8 Cathedral Road, Cardiff.
South Wilts. Miss Barbara Gullick, B.Sc., Crane Bridge Road, Salisbury.
Hants. P. M. Hall, Esq., F.L.S., 12 High Street, Fareham, Hants.
Cornwall. Edgar Thurston, Esq., C.I.E., Queen's Hotel, Penzance.

PLANT NOTES FOR 1933.

†95/6. ✠Saponaria calabrica Guss. Pl. Rar., 164, t. 31. Ital., Graec. Waste heap, Welwyn, Herts, v.-c. 20, H. Phillips. Det. Schinz.

†122(2)/1. ✠Gossypium punctatum Schum. et Thonn. Avonmouth Docks, W. Gloster, 1933, Sandwith and Gibbons.

†132/13. ✠Oxalis semiloba Sond. A South African alien not given in the Oxford List. Polzeath, East Cornwall, v.-c. 2, J. Donald Grose. Det. Kew. The bruised leaves of this plant are used by the Zulus to rub over the mouths of infants suffering from thrush and similar ailments (Ed.).

†178/1. Lathyrus latifolius L. Found in 1913 growing on the face of the cutting near the railway station at Hitchin, Herts. Specimens were sent for drawing purposes to E. W. Hunnybun. It has persisted in this station up to 1932. There were also formerly several plants in more accessible places round the lime kilns, but these have now disappeared. It was in all probability originally an outcast from the garden of A. Ransom, which extended to the edge of the cutting.

The figure of *E.B.*, tab. 1108, drawn from specimens sent by the Rev. Dr Abbot from Hawnes and Bromham, Beds, represents *L. sylvestris* L. (fide R. A. Pryor, *Journ. Bot.*, 1881) and not *L. latifolius*, to which it is credited. See Notes by F. A. N. Garry, on the Drawings for "English Botany" (*Journ. Bot.*, 1903).—J. E. Little.

178/2. L. sylvestris L. In North Herts this plant is very rare. A specimen is in Pollard's Herbarium, dated 1868, but during forty years of field work I had never seen a living specimen from Herts until 1933, when flowering pieces from Little Wymondley were brought to me by A. Bygrave, who had known it there for a number of years.—J. E. Little.

194/14j. ✠A new variety of Rosa micrantha Sm. Early in July 1932, whilst my sister and I were collecting Roses on a favourite bushy hillside near Haslemere, Surrey, I found what seemed to be a fine bush of *Rosa micrantha*, var. *typica*, with glorious deep rose flowers, and with immature fruit of a rich vinous tint (very suggestive of that of good Burgundy or claret). Its prickles also seemed flushed with the juice of the vine, but more restrainedly so than the fruit, being pale and translucent, akin to the glow of a very old and delicate port. Further, the young leaflets had a rosy suffusion as though they had been dipped in wine. Altogether, the effect was most pleasing, and I took a specimen, without any further study at the time. Next day at home, the usual careful examination revealed—to my great surprise—that the styles were densely hispid, indeed they might well be called woolly. Naturally, for a minute or two, I was inclined to suspect that it might be *R. rubiginosa*, but the stem armature, exserted styles, shape of leaflets and general appearance together soon convinced me that it must be *R. micrantha*. A further gathering in greater quantity, a fortnight or so later, showed spreading sepals, and I sent specimens to Col. Wolley-Dod for his opinion. He then thought it might be var. *Sagorskii* Chr., or near it. (Probably that was before he saw Keller's *Synopsis Rosarum Spontanearum Europae Mediae*, or before he had time to digest it.) Circumstances prevented me from getting any later material (with riper fruit) in 1932, but I made a special journey to get such in September 1933. Meanwhile, Col. Wolley-Dod had kindly lent me Keller's bulky *Synopsis*, from a careful study of which I came to the conclusion that this Rose is a new variety of *R. micrantha*, somewhere near var. *drinensis* Rob. Keller. Again I submitted a good supply of material to Col. Wolley-Dod, with evidence in support of such view. I quote from his reply its essential sentences, which are not impaired by the context. "This certainly seems to be a *micrantha* form . . . . Although in the youngest gathering the sepals are reflexed, the later ones rise definitely enough. The shape of the fruit definitely excludes *drinensis*, so we must make a new var. of it." This confirmation of my opinion by Col. Wolley-Dod is very gratifying to me, seeing that almost all my knowledge of the genus *Rosa* is derived from his publications, his correspondence with me, and his very numerous diagnoses of my specimens. But he is far too busily engaged on the compilation of his new *Flora of Sussex* to spare time, during the next year or so, to describe this Rose and get it published. In view of the uncertainty of life, I do not care to wait so long, and have appealed to Mr W. H. Pearsall for help. With his usual kindness he has agreed to have my commonplace English translated into the good Latin, which appears toward the end of this note, and so fulfil the conditions requisite for the publication of a new variety.

At this stage it seems desirable to trace down, from Keller, the steps which have led me to my destination. The descriptions of *R. micrantha*, and the 75 varieties and forms thereof recorded from Middle Europe, occupy no less than 16 pages of the *Synopsis*. I must add that the pages are about 12 inches by 9, and are closely printed. *R. micrantha* is here divided, and again and again sub-divided, into 25 little (shall we say ?) "groups." The following are my steps.

A. Roseiflorae: *Flores ± intense rosci.*
    I. Hispidae: *Pedunculi glandulis stipitatis hispidi.*
        b. Glabrescentes: *Foliola glabra vel subtus tantum ad costam ±, plerumque disperse pilosa.*
            2. Eriostylae: *Styli pilosi.*

The respective alternatives to above would be:—

B. Albiflorae: *Flores albi.*
  II. Nudae: *Pedunculi nudi vel tantum singulis glandulis stipilatis obsiti.*
    a. Pubescentes: *Foliola utrinque vel tantum subtus ± dense pilosa; petioli pubescentes usque tomentosi.*
      1. Liostylae: *Styli glabri.*

In succession, each of these obviously is ruled out.

Here, it may be fitting to point out that var. *Sagorskii* Chr. comes under A. I. a, with petioles "*albo-tomentosi*," and with leaflets "*subtomentosa*."

To return to my first four steps above. The one and only var. or f. which appears in *Synopsis* under A. I. b. 2 is var. *drinensis* Rob. Keller, and is thus described:—*Rami aculeis curvatis muniti; ramuli floriferi inermes; petioli laxe et disperse pilosi usque subglabri, crebre glandulosi; foliola subparva, ± 20 : 11 mm., elliptica, versus basin in acutum cacumen fastigiata, subtus ad costam laxe pilosa, crebre glandulosa; pedunculi disperse glanduloso-hispidi; sepala in dorso et margine glandulosa, post anthesin reflexa; receptacula fructifera globosa, disco lato; styli elongati, ± dense pilosi.*

My own decided opinion, with which Col. Wolley-Dod virtually agrees, is that the Haslemere Rose differs considerably from var. *drinensis*, and must be regarded as a distinct variety. Here are the chief differences. In the Haslemere Rose—1. Flowering branches are *not* unarmed. 2. Sepals are not permanently reflexed after flowering, but at least spreading, and often tending to be suberect. 3. Fruit certainly not globose, but almost elongate. 4. Styles hardly elongate.

Recognising the almost infinite variation so characteristic of the genus, 1 and 4 might pass, but 2 and 3, perhaps more especially the latter, seem vital.

I am not aware of any previous record in Britain of the occurrence of either *Sagorskii* Chr., *drinensis* Rob. Keller, or any other *R. micrantha* form with *densely* hispid styles. The only British Rose even distantly approaching the variety which is the subject of these notes (as regards styles), is a very thinly hispid-styled form from Hayling Island. This has been passed (not without reluctance) by Col. Wolley-Dod as f. *trichostyla* Rob. Keller, "but not typical." The indeterminate Hayling Rose is quite different from that now under consideration.

I must conclude these notes by naming and describing my new Rose, expressing deep indebtedness to Mr W. C. Barton for his translation of such description.

Rosa micrantha Sm., var. *Burgessi* var nov.

Frutex robustus erectus decem pedes altus turionibus multis robustis arcuatis densus formosus; turiones aculeis subaequalibus falcatis vel saepe aduncis modice armati; rami floriferi longitudinis mediocris aculeis turionum aculeis similibus armati; flores saturate rosei; petioli modice glandulosi, paene vel omnino glabri; foliola mediocria vel parva.

in nervis parce pubescentia, cetera glabra, nonnulla ad basin cuneata; pedunculi modice, interdum parce glandulosi, vulgo 1-flori, nonnunquam 2-3-flori; fructus ovatus, saepe sat elongatus; styli valde hispidi vel etiam lanati, modice exstantes; sepala patula, saepe aliquantum suberecta.

Bush compact and shapely, 10 feet high, strong and erect, with many stout arching stems; stems moderately armed, with prickles subequal, falcate, often hooked; flowering branches of medium length, with prickles as on stems; flowers deep rose; petioles glabrous, or almost so, moderately glandular; leaflets medium to small, glabrous except on midribs, which are very feebly pubescent, some leaflets cuneate-based; peduncles moderately glandular, occasionally weakly so, usually solitary, but sometimes 2 or 3-flowered; fruit ovoid, often rather elongate; styles strongly hispid to woolly, moderately exserted; sepals spreading, often tending to be suberect.

When young, the immature fruit is of a rich deep vinous colour, and prickles of much paler vinous, but both fade in drying, especially the latter. Also, the young leaflets often have similar vinous suffusion.

It has affinity with var. *drinensis* Rob. Keller, differing chiefly in shape of fruit and direction of sepals.

I have great pleasure in naming, as above, this interesting variety as a slight tribute to our very good friend, Mr Charles Burgess, the esteemed Honorary Life President of the Godalming Natural History Society, so well known and respected by all inhabitants of the Borough of which he has been six times Mayor.—EDMUND B. BISHOP.

†197/7. ✠COTONEASTER RACEMIFLORA K. Koch. Goblin Combe, near Bristol, N. Somerset, 1933. No doubt planted. J. GIBBONS. Det. MARQUAND.

†210/4. ✠COTYLEDON OPPOSITIFOLIA Ledeb. ex Nordm. Stony ground near a garden at Matlock, per Mrs A. E. EASTES. Det. Kew.

282/2c. ✠DAUCUS GUMMIFER All., var. VILLOSA (Thellung). Durleston Head, Dorset, v.-c. 9, H. PHILLIPS. Det. SCHINZ.

†362/3. ✠TAGETES PATULA L. Waste heap, Welwyn, Herts, v.-c. 20. H. PHILLIPS.

†365/11(2). ✠ACHILLEA SIBIRICA Ledeb., var. TYPICA Regel. Railway wharf, Bristol, 1933, J. GIBBONS.

†404(2). ✠ZOEGEA L. Mant. i. 15 (1767). Benth. & Hook. f., ii. 477.
†404(2)/1. Z. LEPTAUREA L. Mant. i. 117. Syria, Mesopotamia. Haven Street, Ryde, Isle of Wight, 1932, J. W. LONG. Det. SCHINZ.

†532/25(2). ✠LINARIA SIEBERI Reichb. Tip, Bristol, v.-c. 34, 1933. First British record. N. Y. SANDWITH. Mediterranean region.

HIERACIUM—CORRECTIONS.

419/69(2). HIERACIUM SAXIFRAGUM Fries. With reference to *Hieracium saxifragum* Fries, modification, in H. H. Johnston's "Additions to the Flora of Orkney," Sixteenth Paper, p. 3 (4th March 1933), Dr Hugo Dahlstedt, in a note, dated 25th October 1933, on specimens of Reference No. 4731, from Enegars, near the Kame, Hoy, 8th July 1933, informs Col. Johnston that the specimens of James Sinclair's Reference Nos. 760 and 770 from Berriedale and Enegars, respectively, which he formerly determined as *Hieracium saxifragum* Fries, modification, on 3rd January 1933, belong to a good species, namely, *Hieracium pseudomicrodon* Dahlstedt, n. sp., in H. H. Johnston's "Additions to the Flora of Orkney," Thirteenth Paper, pp. 5-6 (1st December 1929), which belongs to Zahn's capital or group-species *Hieracium saxifragum* Fries.

[Delete 419/69(3) in *Rep. B.E.C.*, 1932, 23. See *Rep.*, 1929, 24.]

419/157. H. SAGITTATICEPS Dahlstedt. With reference to *Hieracium sagittaticeps* Dahlstedt, n. sp., in H. H. Johnston's "Additions to the Flora of Orkney," Fifteenth Paper, pp. 4-5 (8th March 1932), Dr Hugo Dahlstedt, in a note, dated 23rd October 1933, to Col. Johnston, says that this species is the same as *Hieracium bifidum* Kitaibel, subspecies *subtenue* W. R. Linton, and that as Linton's name is the oldest it should be used in preference to *Hieracium sagittaticeps* Dahlstedt, which is therefore a synonym of it.

[Delete 419/110(2). See *Rep. B.E.C.*, 1931, 729.]

419/242. H. INULOIDES Tausch, subspecies STRICTUM Fries, form ANGUSTIFOLIA Dahlstedt. With reference to this plant in H. H. Johnston's "Additions to the Flora of Orkney," Twelfth Paper, p. 8 (1st May 1929), James Sinclair's two specimens of his Reference No. 596 from the north-east side of Aith Hope, South Walls, Hoy, Orkney, 9th August 1928, were determined under the above-mentioned name by Dr Hugo Dahlstedt, on 20th February 1929; and my forty-one specimens of my Reference No. 4258, from the same station, 20th August 1929, were also determined under the same name by Dr Hugo Dahlstedt, on 18th October 1929.

On 22nd August 1931 Mr John F. G. Chapple, in my company, collected specimens at the same station, identical in character with the specimens collected by James Sinclair and me in 1928, and 1929, respectively, which the late Dr George Claridge Druce sent to Professor Karl Hermann Zahn, who determined them as *Hieracium umbellatum* Linnaeus, subspecies *maritimum* (F. J. Hanbury) Zahn, in 1931.

On 14th September 1933 I resubmitted specimens of James Sinclair's Reference No. 596 and my 4258 to Dr Hugo Dahlstedt, who, in a note dated 31st October 1933, wrote as follows:—"I have determined this species as *Hieracium strictum* Fries, form *angustifolia*, but I see that it is more allied to *Hieracium umbellatum* Linnaeus, from which it differs through the hairy heads, but which it resembles through the numerous narrow leaves. It seems to be a species connecting *Hieracium umbellatum* Linnaeus with *Hieracium strictum* Fries. As the name that Hanbury has given it is the oldest it may retain this name *Hieracium maritimum* (Hanbury) Zahn, under" [Zahn's capital or group-species] *Hieracium umbellatum* Linnaeus.

The only other station for this species is Melvich, in Sutherland, Scotland.

[See *Rep. B.E.C.*, 1929, 26.]

HIERACIUM—ADDITIONS.

419/15(2). ✠H. PATENS Dahlstedt, n. sp. *Caulis* mediocriter altus ubique dense mollipilosus supra folium caulinum etiam parce glanduliferus, efloccosus. *Folia* rosularia plurima supra obscure subtus pallidius glaucescenti—viridia exteriora ovalia—ovata ± obtusa sparse acute et breve denticulata interiora ± late ovato-lanceolata basi praesertim sparse dentata ± acuta supra glabrescentia vel rare pilosa, subtus dentiuscule in nervo dorsali dense et molliter et sat longe pilosa, petiolis pilis longis dilutis crebre vestitis; *folium caulinum* parum anguste ovato-lanceolatum ad basin acute denticulatum sessile et ± amplectens, acutum supra fere glabrum subtus ± pilosum. *Inflorescentia* furcata expansa 2-3-cephala saepe ramo longo ex axillo folii caulini acuta, ramis acladium 30-40 mm. longum ± et saepe sat longe superantibus ± canofloccosis pilis sparsis vel nullis et glandulis obtectis. *Involucrum* mediocre obscure canoviride. *Squamae* lineares exteriores breves obtusiusculae longae acutiusculae pilis densis basi nigra apice albidis et glandulis sparsis vel parcis parum conspicuis vestitae exteriores praesertim in margine ± floccosae. *Calathium* circa 40 mm. diametro. *Ligulae* obscure luteae. *Antherae* polline carentes. *Stylus cum stigmatibus* obscurus siccus ater.

This species belongs to Cerinthoidea. It is especially characterised by the numerous rosular broad sparsely dentate leaves, the long and densely pilose stem somewhat glandular upwards, and the furcate inflorescence, with sparsely pilose more richly glandular peduncles and densely pilose sparsely glandular heads. I think it may be placed under *Hieracium olivaceum* Grenier et Godron, near *Hieracium flocculosum* Backhouse, or *Hieracium jaculifolium* F. J. Hanbury. *Hieracium patens* Dahlstedt belongs to Zahn's capital or group-species *Hieracium olivaceum* Grenier et Godron, and in "The London Catalogue of British Plants," Eleventh Edition (1925), it should be inserted between Nos. 1025 and 1026.

I am indebted to Dr Hugo Dahlstedt, Skärsätra, Lidingö, Sweden, for the above description and remarks on this new species, described by him, on 30th October 1933, from my two specimens of Reference No. 4741, which have been seen by him, as well as my one specimen of Reference No. 4742.

Locality.—(1) Reference No. 4741, small, heathery, freestone, rocky ravine on hillside, 450 feet above mean sea-level, west side of Nowt Bield, Ward Hill, Hoy, Orkney, 10th July 1933, H. H. Johnston.

Native. Rare. Plants in full flower. (2) Reference No. 4742, large, heathery, wood-rushy, mossy, freestone ravine on hillside, 390 feet above mean sea-level, west side of Nowt Bield, Ward Hill, Hoy, Orkney, 10th July 1933, H. H. Johnston. Native. Rare. Plants in full flower. The following notes were made by me from my two specimens of Reference No. 4741, on 10th July 1933, when the plants were alive:—Stem densely clothed with long spreading whitish hairs. Leaves glaucous-green and thinly hairy above paler glaucous-green and denser hairy beneath and on the margins; petiole densely hairy. Phyllaries densely clothed with long curved bristles, blackish at the base and pale whitish-brown at the apex. Corolla yellow, hairy beneath at the base. Style and its two recoiled branches brownish-yellow.—H. H. JOHNSTON.

419/94(2). ✠H. DIPTEROIDES Dahlstedt, n. sp. *Caulis elatius*, monophyllus, inferne dentiuscule superne sparsim longepilosus a medio sparsim apicem versus densius floccosus glandulis parcis adspersus. *Folia* læte viridia, rosularia 4-5, exteriora ovalia reliqua ± lanceolata obtusiuscula integra vel parcissime dentata, interiora sæpe parce et late dentata magis acuta, supra fere glabra subtus sparsim in nervo dorsali densiuscule longe pilosa; *folium caulinum* anguste lanceolatum—lineari-lanceolatum, integrum acutum. *Inflorescentia* paniculata polycephala ramis suberectis, acladium circa 15 mm. longum longe superantibus sparsim glandulosis et parce piliferis dense floccosis, pedunculis densiuscule-crebre glandulosis parce piliferis densius canofloccosis. *Involucrum* sat obscure viride basi ovata, crebre glandulosum pilis raris brevibus obscuris intermixtis, in marginibus squamosum floccis parcis præditum. *Squamæ* exteriores breves lineares obtusiusculae interiores anguste lineari-lanceolata subacutae. *Calathium* 25-30 mm. diametro, obscure luteum. *Antheræ* polline carentes. *Stylus* fusco hispidatus siccus sat obscurus. *Achenium* atrum.

This species belongs to Silvaticiformia Dahlstedt, and it is very nearly related to *Hieracium dipterum* Dahlstedt, from Middle Sweden, but it differs from it through more entire leaves and very dense glandules on the peduncles and heads. *Hieracium dipterum* Dahlstedt has only a few or no glandules on the pedicels and few glandules on the slightly more hairy heads. The leaves of *Hieracium dipterum* Dahlstedt are often more dentate and the cauline leaves are often two and very long and ordinarily two-dentate at the base.

Hieracium dipteroides Dahlstedt belongs to Zahn's capital or group-species *Hieracium murorum* Linnæus, near *Hieracium torticeps* Dahlstedt, and, in *The London Catalogue of British Plants*, Eleventh Edition (1925), it should be inserted between Nos. 1074 and 1075.

I am indebted to Dr Hugo Dahlstedt for the above description and remarks on this new species, described by him, on 21st October 1933, from my three specimens of my Reference No. 908, all of which have been seen by him.—JAMES SINCLAIR.

Locality.—Reference No. 908, grassy, rocky, ferny banks at burnside, Urlar Burn, tributary of the River Tay, Aberfeldy, Perthshire, Scotland. 20th June 1933. JAMES SINCLAIR. Native. Common. Plants in full flower. Corolla yellow. Style and stigmas brownish-yellow. H. H. JOHNSTON.

419/146(2). ✠H. FURCILLIFERUM Dahlstedt, n. sp. *Caulis* humilis inferne parce pilosus superne subglaber apicem versus leviter floccosus, aphyllus vel folio lineari infra medium præditus. *Folia* obscure viridia rosularia plurima exteriora ± ovalia obtusiuscula, interiora ± ovata—cordato-ovata inferne sat crebre et acute brevidentata superne ± integra breve acuta, supra subglabra subtus parce in nervo dorsali densius pilosa, petiolis dense et longe pilosis. *Inflorescentia* furcata ramo sæpe ex axillo folii caulini aucta ramis longis monocephalis vel bicephalis acladium 60-70 mm. longum ± superantibus ± dense cano-floccosis pilisque fuscis paucis glandulis singulis oblectis. *Involucrum* mediocre vel sat magnum ± canoviride basi ovata. *Squamæ* angustæ, exteriores breves subacutae, interiores longæ in apicem ± acutum fere nudum protractæ, pilis fuscis ± duriusculis, glandulis solitariis parum conspicuis et ubique præsertim in marginibus floccosæ. *Calathium* obscure luteum circa 40 mm. diametro sat radians. *Antheræ* polline carentes. *Stylus cum stigmatibus* sordide luteus.

This species is characterised by very broad, mostly ovate or subcordate leaves of a dark green colour, with very sharp and short dentate margins, and petioles densely clothed with long brownish-red hairs. The inflorescence is furcate, with long peduncles and acladium. The heads are clothed with dusky hairs, with a few glandules and stellate hairs especially at the margins.

The species is to be placed under Zahn's capital or group-species *Hieracium bifidum* Kitaibel, near *Hieracium stenolepis* Lindeberg; and, in *The London Catalogue of British Plants*, Eleventh Edition (1925), it should be inserted between Nos. 1123 and 1124.

I am indebted to Dr Hugo Dahlstedt for the above description and remarks on this new species, described by him, on 23rd October 1933, from my four specimens of my Reference No. 858, all of which have been seen by him.—JAMES SINCLAIR.

Locality.—Reference No. 858, grassy clefts of rocks, south-east side of Arthur Seat, Hunter's Bog, Midlothian, Scotland, 27th May 1933. JAMES SINCLAIR. Native. Common. Plants in full flower. Corolla, style, and stigmas yellow. H. H. JOHNSTON.

423/35(2). ✠TARAXACUM UNGUILOBIFORME Dahlstedt, n. sp. *Folia* sat obscure viridia ± elongata lanceolata, lobis ± approximatis ± retroversis et saepe hamatis, basi lata margine superiore ± convexo ± subulato-dentata apicibus recurvis, haud raro in apices ± porrigentes contractis, interlobiis nullis vel paullum evolutis ± laciniato-dentatis, lobo terminali ± sagittato lobulis lateralibus ± retroversis et saepe hamatis, in foliis exterioribus parvo in foliis interioribus ± magno marginibus convexis integris breve acuto; petiolis pallidis. *Scapi* folia aequantes vel paullum superantes ± colorati. *Involucrum* mediocre obscure viride (atro-viride). *Squamae* exteriores ± ovato-lanceolatae in apicem acutiusculum ± purpurascentum sensim acutatae ecorniculatae, anguste marginatae, initio ± adpressae deinde ± patentes, interiores lineari-lanceolatae, ecorniculatae. *Calathium* parvum. *Ligulae* angustae sat obscure luteae marginales extus stria ± purpurascente notatae. *Antherae* polline carentes. *Stylus cum stigmatibus* luteus. *Achenium* pallide vitellinum apice acute spinulosum, caeterum ± tuberculatum vel inferne laeve circa 3.5 mm. longum, 1 mm. latum in pyramidem 0.5 mm. longum conicum abiens.

This species belongs to Spectabilia, and it seems to be related to *Taraxacum unguilobum* Dahlstedt, but it differs from it through stouter growth, darker green leaves with longer curved or frequently hamate lobes, ordinarily with more and longer teeth, and pale yellowish-red achenes. The cusps of the lobes are often more elongated, narrower and turned upwards, especially on the inner leaves. The outer phyllaries of the heads are loosely adpressed or ordinarily spreading.

I am indebted to Dr Hugo Dahlstedt for the above description and remarks on this new species, described by him, on 18th October 1933, from my three specimens of my Reference No. 4638, all of which have been seen by him.

Locality.—Reference No. 4638, grassy, rocky sea-cliffs, 10 feet above mean sea-level, south-east side of Holm of Houton, near Orphir in Mainland, Orkney, 5th June 1933, H. H. Johnston. Native. Common. Plants in unripe and ripe fruit mostly shed, and sparingly in flower. Outer phyllaries spreading both in flower-bud and flower; inner phyllaries simple (not gibbous or appendaged) at the dark purple apex. Corolla yellow, striped purplish beneath in the outer florets. Style and its two recoiled branches yellow. Achenes pale yellowish-red. Fruit-receptacle flattish-convex. This new species grows at the same station as *Taraxacum unguilobum* Dahlstedt (fide Hugo Dahlstedt, who saw my three specimens of my Reference No. 3638A on 6th October 1933).—H. H. JOHNSTON.

423/79(3). ✠T. PLICATUM Dahlstedt, n. sp. *Folia* obscure viridia supra maculis atropurpureis parvis-mediocribus sparsis praedita parce pilifera-subglabra, subtus pallidiora et pilis articulatis brevibus ± dense vestita, exteriora et intermedia ± lineari-lanceolata—anguste lanceolata—anguste lanceolata crebre lobata lobis mediocribus basi lata-latissima in apicem obtusiusculum parum productis, in margine superiore saepe convexis superioribus ± integris inferioribus ± denticulatis ± retroversis vel ± patentibus, in angulis loborum saepius ± plicata, lobo terminali mediocri ± sagittato, obtusiusculo, lobulis lateralibus brevibus ± retroversis, interiora anguste obovato-lanceolata, lobo terminali mediocri-magno sagittato integro marginibus convexis obtuso-obtusiusculo, lobis caeteris ± recurvatis subhamatis magis acutis saepe paullum distantibus; petiolis pallidis. *Scapi* folia plerumque aequantes ± colorati. *Involucrum* sat magnum crassum ± obscure viride. *Squamae* exteriores in alabastro ± adpressae—erecto-patentes, deinde ± recurvae

± lanceolatae—ovato-lanceolatae subtus obscure virides, supra pallidiores et saepe ± purpureo-violascentes, interiores sat latae lanceolatae, apice obscure purpurascentes, omnes ecorniculatae. *Calathium* circa 30-35 mm. diametro. *Ligulae* subobscure luteae marginales extus stria badio-violacea notatae. *Antherae* polline carentes. *Stylus cum stigmatibus* luteus. *Achenium* badio-stramineum circa 3 mm. longum ad 1 mm. latum apice breve spinulosum, caeterum ± tuberculatum vel fere laeve in pyramiden brevem 0.5 mm. longum sat abrupte abiens.

This species belongs to Vulgaria, and it is allied to such Scandinavian species as *Taraxacum pallescens* Dahlstedt, *Taraxacum expallidum* Dahlstedt, and related species. It is characterised by dense lobed leaves with broad somewhat obtuse slightly recurved lobes, sagittate more or less prolonged end lobes in the outer leaves, more acute lobes and more or less broad sagittate-ovate end lobes with convex margins on the inner leaves, but especially by the dense short articulated hairs on the under surface of the leaves.

I am indebted to Dr Hugo Dahlstedt for the above description and remarks on this new species, described by him, on 14th October 1933, from my two specimens of my Reference No. 4639 and three specimens of my Reference No. 4644, all of which have been seen by him.

Locality.—Grassy, rocky sea-cliffs, 15 feet above mean sea-level, north-east side of Holm of Houton, near Orphir in Mainland, Orkney. (1) Reference No. 4639, 5th June 1933, and (2) Reference No. 4644, 10th June 1933, H. H. Johnston. Native. Common. Plants in flower and unripe fruit, and also sparingly in ripe fruit in Reference No. 4644. Leaves dark green and spotted dark purplish above, paler green beneath. Outer phyllaries recurved both in flower-bud and flower; inner phyllaries simple (not gibbous or appendaged) at the dark purple apex. Corolla yellow, striped brownish-purple beneath in the outer florets. Style and its two recoiled branches yellow.—H. H. JOHNSTON.

446/7. ERICA VAGANS L. Mr R. Kempthorne sent in specimens of some very interesting new forms of this, gathered on the Lizard Downs. Dr Turrill will deal with these in a subsequent paper, but herewith are given preliminary notes by Mr Kempthorne.

Forma *campanulata*. The lobes of the corolla are everted, and not parallel to the stamens or turned in towards them as in the type. The corolla is therefore truly bell-shaped. Lizard Downs, 1930, 1, 2.

Forma *tubulosa*. The corolla is long, narrow and tubular, roughly square in cross section and not inflated. Lizard Downs, 1930, 1, 2, 3.

Forma *reflexa*. The distal half of the corolla is turned back on the proximal half and so the corolla appears only half the size of that of the type and less than a third of the length of the stamens. Lizard Downs, 1933.

Flore pleno. Two plants. The corolla in each is replaced by a rosette of bracts and the peduncle covered with scattered bracts. Lizard Downs, 1932, 3. R. KEMPTHORNE.

457/4. LIMONIUM RETICULATUM Mill. With reference to the note on this species in our last year's *Report* (1932, p. 27), Mr P. G. Beak has sent in a fine vouching specimen gathered by Mr T. R. Peace on the gravelly edge of the salt-marsh, Holme-next-the-Sea, near Hunstanton, W. Norfolk, v.-c. 28, in July 1933. We are greatly obliged for this definite proof that the plant is not extinct in v.-c. 28, and have added the specimen to the Society's herbarium.

543/17(2). ✠VERONICA PRÆCOX All. As already recorded in a short note in the *Journal of Botany* (A. J. Wilmott, *Journ. Bot.*, lxxi, p. 159 (1933)), this plant was discovered in the Breckland area of Suffolk on April 16th, 1933, and is an interesting addition to the British Flora. *Veronica præcox* is a good species of the " Bentham " standard, and at once attracted attention as something plainly distinct from the known British species of that genus, and good photographs of the plant *in situ* were obtained by A. W. Graveson. Partially pressed specimens sent to Mr Wilmott at the British Museum (South Kensington) were immediately identified.

Veronica præcox is most closely allied to *V. triphyllos*, from which it may be known by the smaller and much less deeply cut stalked leaves, the stiffer spicate inflorescence, the brighter colour of the corollas, the capsule being longer than broad (instead of about as broad as long), and by the calyx being shorter than the corolla. As in *triphyllos* the seeds are greatly hollowed out on one side (pelviform), but they differ from those of that species in being smooth instead of finely rugose.

From *arvensis* it is distinguished by the deeper serrations of the leaf, the much larger brighter coloured corolla which exceeds the sepals, and the fruiting peduncles exceeding the bracts.

From *verna* it is easily known by the less cut leaves, less crowded racemes of larger flowers, fruiting peduncles exceeding the bracts, and longer capsules. Both *verna* and *arvensis* have seeds plane or convex on both surfaces.

The habitat was a typical Breckland fallow where *V. præcox* was associated with *Erophila verna*, *Silene conica*, *Silene Otites* (round edge of field), *Cerastium semidecandrum* and *viscosum*, *Stellaria Boræana*, *Arenaria tenuifolia*, *Medicago minima*, *Vicia lathyroides*, *Potentilla argentea*, *Saxifraga tridactylites*, *Anthemis arvensis*, *Veronica arvensis*, *Myosotis collina*, *Phleum arenarium*, *Festuca ambigua*, *Apera interrupta*, etc. (some of these were listed on the June visit) Such a flora is characteristic of the fields in which *V. triphyllos* occurs, and indeed these two rare Veronicas grew together at a locality discovered by Mr N. Y. Sandwith and friends about two miles distant. This second locality greatly strengthens the claim for the inclusion of *V. præcox* in the British Flora. The continental distribution is in favour of it being native here as it occurs in Germany associated with a very similar " Steppe " type of flora (see Salisbury " The East Anglian Flora." *Trans. Norfolk and Norwich Naturalists' Society*, Vol. xiii. Part 3 (1931-2), pp. 233-240). The species also occurs in Belgium, and throughout most of France, being frequent in the district round Paris (Cosson and Germain, *Fl. des Environs de Paris*, p. 350, 1861), and certainly extending as near to Britain as the Departements of Eure and Seine-Inférieure (Brébisson, *Fl. de la Normandie*, 1879). The fact that, whereas *V. triphyllos* was known in Britain from East Anglia as long ago as 1670 (Ray *Cat.*), *præcox* has eluded discovery until 1933, may well be explained by the very early flowering of the latter. By April 16th it was well in flower and bore numerous capsules containing immature seeds. On June 6th the plants were completely dried up, leaves were unrecognisable, and only rattling seed capsules with the characteristic seeds remained. The discovery of a second locality three weeks after the first was known indicates the likelihood of further stations being found in the near future by careful search early in the Spring.

A formal description of *Veronica præcox* is appended:—

VERONICA PRÆCOX Allioni, Auct. Fl. Pedem., 5, t. 1, f. 1; *V. romana* Scop., Fl. Carn., 1, p. 18; *V. ocymifolia* Thuill., Fl. Paris, ed. 2, p. 10; *V. segetalis* Pers. *V. viscida* W. & K. *V. viscosa* Kit.

Icones.—Reichenbach, mdccxxi. Hegi, G., Fl. von Mittel-Europa, Vol. vi/i, p. 50, fig. 30 (h—l). Coste, H., Fl. France, Vol. iii, t. 2732. Cosson & Germain, "Atlas," t. xvi (fig. 6 and 7), 1845.

Plant annual. Stem erect, 5-15 cm., glandular-pubescent, simple or with somewhat spreading branches. Leaves rather fleshy in texture, often a purplish-red below. Leaves of the mid-stem shortly stalked, opposite, deeply toothed, lowest leaves less deeply cut. Bracts oblong, slightly toothed, the uppermost often almost entire. Flowers in loose bracteolate terminal racemes. Corolla bright blue (about 6 mm. in diameter), equalling or exceeding the calyx. Calyx of four oblong unequal lobes, clothed in long white hairs. Fruiting peduncles ascending, equalling or exceeding the bracts. Capsule oblong-suborbicular, slightly longer than broad (about 5 × 4 mm.), notched, glandular-ciliate. Style about 2 mm. long, considerably exceeding the notch in the capsule. Seeds smooth, bright brownish-yellow, pelviform (convex on one face and deeply hollowed out on the other).

Distribution.—Central and Southern Europe (France, Spain, Belgium, Holland, Germany, Switzerland, Italy, Austria, Czecho-Slovakia, Balkans, South Russia), Asia-Minor, Caucasus, Northern Africa.

Habitat.—Sandy fallow field near Barton Mills, West Suffolk, J. E. LOUSLEY, April 16th, 1933, and June 6th (fruit), 1933); also from a similar field about two miles distant, Mrs SANDWITH and friends, May 7th, 1933. J. E. LOUSLEY.

558/3. ×MENTHA NILIACA Jacq., var. WEBBERI Fraser, var. nov. (M. LONGIFOLIA × ROTUNDIFOLIA). Stem stout, erect, 2-3½ feet high, each face of the square measuring 5-7 mm. wide, glabrous below and polished, brown, ± densely pubescent above with short recurving hairs, much branched above the middle, with a dense inflorescence on strong plants; branches slender, sharply ascending, flexuous, 3-9 in. long. Leaves oblong, obtuse, the upper ones becoming acute, sessile, cordate or subcordate at the base, 7-9.5 cm. long, by 2-3.5 cm. wide, gradually shortening towards the apex of the stem, irregularly and sharply serrate, puberulous above, softly pubescent beneath on the lower leaves, the uppermost tomentose with short hairs beneath, and dull, glaucous green, rugose, and netted with sunk veins when dry; serratures mostly incurved at the tips, 0.5-1.5 mm. deep. Leaves of the branches small, oblong, and otherwise like those on the stem. Hairs on all parts of the plant simple, 5-9 jointed on the leaves. Inflorescence on the stem and branches once or twice trifurcate, with slender spikes 2-5 cm. long; bracts linear, plumose, hidden by the corolla during anthesis. Calyx tube thinly puberulous with 1-3 jointed hairs; calyx teeth ciliate with 1-4 jointed hairs; pedicels with 1-2 jointed, recurved hairs, sometimes subglabrous. Corolla thinly hairy externally, pale pink, with a purple spot on each lobe, sometimes fading to white. Stamens included; flowers functionally ♀. August and September.

The above is a strong-growing Mint, notable for the length of its *oblong very rugose leaves* both fresh and dried, and the *much branched and dense inflorescence*, when in good form. Allied to var. *nemorosa*, but without the broad base to the leaves. Canal bank, Slateford, and waste ground near Temple, both in Midlothian, 1933, D. H. WEBBER; bank of Ben Lester Burn, Arran, v.-c. 100, 1929, E. M'ARTHUR.

†577/7. STACHYS ANNUA L. In "The Naturalist" for 1st January 1932, Mr R. J. Flintoff has an interesting note on the discovery of this species at Dalby Nut Wood Tops on the 5th October 1931, by Mr James Green of Thornton-le-Dale—a new record for the North Riding of Yorkshire, v.-c. 62. On 26th July 1933 the plant was again gathered by Mr James Green on the limestone near Pickering, and was sent to me by Mr Flintoff for confirmation of the name. As there is only one short description of this species (Bab. *Man.*, 1922, 335) in our British Floras—and many erroneous references—it seems advisable to give herewith a more extended description and to amplify or rectify some published details.

It is generally described as a "south European annual" (Benth. & Hook., 1924, 367) or "Native of Europe (not northern portion)"—*Fl. Surrey*, 1931, 530—but Coste (*Fl. Fr.*, iii, 117) gives it as annual or perennial and there seems little doubt that in Britain it is not invariably an annual species. Its distribution is not confined to southern Europe but extends to Belgium, Germany, and even to the middle and south of Sweden as a rare plant. (Lindman *Svensk Fanerogamflora*, 1918, 473).

As an alien species it is not included in Druce's *Comital Flora* but both Beeby and Salmon suggested that it was possibly native in Kent, where it has been known for at least a century. It was first found near Gad's Hill in 1830, later plentifully in cornfields above Strood (1855) and abundantly on the open downs at Trottescliffe (1875) and at various places between Gad's Hill and Sevenoaks (1883). It occurred plentifully by the canal near Aintree, West Lancs., for many years prior to

1892 and many of the plants were at least a foot in height, but it subsequently disappeared from this station. In 1895 it was reported from Gomshall in Surrey and since that date has been recorded from Cornwall, North Somerset, West Gloucester, S. Hants, Surrey, Sussex, Oxfordshire, Hertfordshire, Buckinghamshire, Northamptonshire, Notts., Glamorgan, E. Suffolk, S.W. Yorks. (63), Mid-West Yorks. (64), N.E. Yorks. (62).

These are all the records known to me, but they suggest that the plant is much more generally distributed than is usually imagined and is extending its range. To facilitate its identification in other stations the following description may be helpful.

Stachys annua L. Plant annual or perennial (?), from 4 in.-16 in. in height, erect, branched, stem finely pubescent. The leaves are not "glabrous" (as usually stated) but minutely pubescent on both surfaces, especially the lower; cauline leaves oval-oblong or oblong-lanceolate, blunt, crenate-serrate, narrowed into the petiole. Floral leaves lanceolate, acute, entire or nearly so. The flowers vary in colour but the terms "yellow" and "cream-white" are misleading. The yellow is always very pale (but distinct) and is usually confined to the lower lip, the upper lip being most often white. The flowers are in whorls of 3-6. The calyx is very distinctive; narrowly campanulate, densely hairy with fine spreading glandular and eglandular hairs—the latter the longer. The teeth are *arcuate*, lanceolate-acuminate, with a short ciliate point. As a rule the teeth are shorter than the tube. Both on the Continent and in this country the plant appears to have a preference for calcareous soils. W.H.P.

†600/34(6). ✠Chenopodium rostratum Aellen (sp. nov. ined.). (In Medd. Goteb. Bot. Traedg., viii (1933), p. 176). First found in Sweden. Viewfield Road, Arbroath, Angus, 1912, R. & M. Corstorphine. Det. Aellen.

†615/7g. ✠Polygonum Persicaria L., subsp. hirticaule Danser. Cf. Bull. Jard. Bot. Buitenzorg, ser. 3, viii, p. 184 (1927). Probably from S. Eastern Asia. Selby, v.-c. 61, W. A. Sledge. Det. Danser.

†615/35. ✠P. Bungeanum Turcz. Cf. Contr. Gray Herb. Harv. Univ., 88 (1930), p. 87. Olympia Sidings, Selby, v.-c. 61, W. A. Sledge. Det. Danser.

†615/36. ✠P. pennsylvanicum L. Cf. e.g. Britton & Brown Illust. Fr. North U.S., 2, p. 557. Olympia sidings, Selby, v.-c. 61, W. A. Sledge. Det. Danser.

†628/25. ✠Euphorbia peploides Gouan Fl. Monsp., 174. Europe, Afr. bor. Hitchin, Herts, v.-c. 20, H. Phillips. Appeared in the garden after some spring plants from Meran (Italy) had been planted. Det. Schinz.

633/2(2). ✠ULMUS ELEGANTISSIMA Horwood, in Flora of Leics. and Rutland, 1933, 482. The Midland Elm. "A. *U. carpinifolia* differt habitu diffusiore; ramulis minoribus; foliis minoribus angustioribus sub-cordatis et subaequalibus ad basin subglabris, margine crenato; fructibus minoribus, lobis sinus samarae incurvatis falcatis. Floribus et fructibus serotinis. Maio."

650/10. SALIX CINEREA L. Mr J. E. LITTLE writes: "I notice that in consequence of the opinion of Floderus, Mr J. Fraser now says that *S. cinerea* is not native in Britain (*Rep. B.E.C.*, 1932, pp. 450, 369 and 29). I enclose some evidence that this statement may need qualification. In 1921 I distributed sheets of this species from Sootfield Green, Herts (*Rep. B.E.C.*, 1921, 578), which were passed as being correctly named by Pearsall and Fraser. A sheet from the same bush was sent to Dr Rudolf Görz of Brandenburg. On this he commented that whereas he had previously been inclined to deny the existence of typical *S. cinerea* in England, this sheet (to which I afterwards added the Ref. No. 739 in my herbarium—now at Cambridge—of the same bush), altered his opinion. He writes: " From the sheet which you have sent me, there appears to be no doubt that the true *S. cinerea* is native in England."

†651/10. ✠POPULUS REGENERATA Schneid., ♀. Near Keynsham, N. Somerset, 1932, N. Y. SANDWITH.

658/1. HYDRILLA VERTICILLATA. Twenty years having elapsed since we discovered this species in Esthwaite Water, N. Lancs, and as we are often asked to account for the presence of this sub-tropical species in Britain, it may be of interest to briefly review its origin and progress. It was discovered by us in July 1914 and specimens were included in the distribution of that year. After a sufficiently lengthy interval Dr W. A. Sledge is again distributing the plant this year, and for that reason also this note is compiled.

Hydrilla is a native of Asia (E. Indies); Central Africa, Madagascar and Mauritius; and Australia. It is also found in Pomerania (N.E. Prussia) and some of the Western provinces of Russia, but how far indigenous in Europe it is difficult to say. These stations are, however, by far the nearest to Britain and it is, therefore, from them that the species could have been most easily transported. We have known the local conditions at Esthwaite intimately for 25 years and have visited it monthly for many of these. We have, therefore, ample grounds for the following suggested explanation of the plant's introduction there. The lake is about 3 miles long, a private water on the Graythwaite Estate, very secluded and quiet, with abundant reed-swamps and fens at its northern and southern extremities. These covers are the haunts of great numbers of aquatic birds of many species and in winter you can put up large flocks of wild duck at any time.

In Europe the farther you go East, the colder the winters, those of Pomerania (the nearest continental station and 700 miles due East of Esthwaite) being much more intense than ours and waters freezing much earlier. We may readily imagine wild duck—diving and feeding among *Hydrilla* there—being ultimately driven off by the formation of ice. With unerring instinct they fly West to a milder climate; passing over the English Lake District the quietude, seclusion, and abundant cover of Esthwaite attract them and they alight. Some of them may have slender threads of the aquatic plants among which they had been feeding still hanging round their necks, or sticking to their plumage. Much more certain is it that in the mud or clay on their webbed feet are embedded seeds or winter-buds of *Hydrilla* and other delicate linear-leaved species. The ducks swim about, the mud or clay softens and falls off, carrying with it winter-buds of *Hydrilla*, which, finding a congenial habitat of the richest silt, establish themselves and grow. The reader who knows little of Nature may call this a fanciful picture, but its main details are beyond dispute and have been authoritatively established by many competent observers. It may be contended that 700 miles is too great a distance for such suggested transport, but wild duck have been caught and ringed on the shores of the Caspian Sea and during the same winter shot on Lough Neagh in Ireland—a distance twice as great as that tentatively here advanced, and along the same E. to W. line of flight.

The only alternative hypothesis, that *Hydrilla* is in its European stations vestigial, presents far too many difficulties to be seriously entertained, we consider.

It is gratifying to know that *Hydrilla* in 1933 is as flourishing as in 1914 and shows no signs of decrease. Having promised Mr A. J. Wilmott the first flowers we found, diligent search has been made for these for very many years, but so far none have been discovered. On the contrary the plants produce abundant winter-buds and these are probably the only means of propagation in this country. W. H. P.

†719/9. LUZULA ALBIDA DC. *L. nemorosa* (Poll.) Mey. This European species of Woodrush has already been reported from the following vice-counties:—3, 8, 17, 22, 38, 40, 60, 70, 76, 80, 83, 90, 97. It is most often found in damp places by streams, or in woods, preferably on siliceous soils. The plant is loosely caespitose, 16 in. to 32 in. in height, hairy. Leaves long, linear-lanceolate, erect, ± hairy, the basal up to 3-5 mm. wide. Inflorescence diffusely corymbiform, lax, slightly shorter than the floral leaves, spreading, with divaricate branches, the ultimate branchlets terminated by 3-8 flowered glomerules. Flowers ashy white or occasionally rose-pink, 3-4 mm. diam., subsessile: perianth-segments lanceolate-acute, three of them distinctly shorter than the other three. Anthers yellowish, slightly longer than the filaments. Capsule trigonous-ovoid, dark, apiculate-beaked. Seeds terminated on one shoulder by a small tubercle. June-July. (See New County Records.)

737/5. POTAMOGETON ALPINUS Balb., f. LONGIFOLIUS Laestadius ap. Beurl. Syn. in Bot. Not., 1853, 88. (= *longifolius* Tiselius, Pot. Suec.

Exsicc., I, 1894, n. 15). This interesting form was collected by Mr Geo. Taylor at Arne, near Wareham, Dorset, v.-c. 9, on September 16, 1933, and is now in Herb. Mus. Brit. It is the first British example of its kind which I have seen. The leaves are all submerged, of delicate texture, translucent, very long and narrow—up to 150 mm. × 10-15 mm.—tapering above and below. The apex is blunt, the margins entire and the midrib strongly reticulate, as is always the case in this species. The British examples possess an unusual character in their inordinately long and gradually tapering bases which in some cases become obvious petioles 1½ in. or more in length. The plants were sterile but it is hoped that fruiting examples may eventually be procured.

Similar specimens in Swedish exsiccata are frequently labelled *longifolius* Tis.—a synonymous but later and invalid name. It was, however, adopted by Graebner in Engler's *Pflanzenreich*, iv, 2, 73, and is twice used on the same page in hopeless confusion—as a sub-var. of var. *angustifolius* A. & G. and as a var. (for sub-var.) of var. *obscurus* (DC.). The same reference to Exsicc. n. 15 is given in each case, with identical descriptions. In the former the date is (1886) and in the latter (1894). The late Mr Arth. Bennett called attention to the unreliability of some of the nomenclature in this volume (Heft 31), and a further example on the same page may be instanced. The same Exsicc. —Tisel. n. 136 (1896)—is cited on p. 73 for *brevifolia* Tis., a sub-var. of var. *angustifolius*, and on p. 74 for *brevifolius* Tis., a sub-var. of var. *obscurus*. Two names (one mis-spelt) for the same form.

737/18. P. ZOSTERIFOLIUS Schum. In attempting to separate this species from the rather similar *P. acutifolius* it is still the practice to attach too much importance to the leaf-apex as a diagnostic character. If the inset figure of the leaf-apex of *P. zosterifolius*—Butcher, 387D, or Fryer, Plate 50—be compared with that of *P. acutifolius*—Fitch, 966, or Fryer, Plate 51—it will be seen that they are very dissimilar and suggest that the two species could be readily distinguished by the leaf-apex alone. Unquestionably this has often been assumed and frequently with disastrous results. *P. acutifolius* occasionally occurs in Britain (and more commonly abroad) with leaves possessing a leaf-apex exactly like that of *P. zosterifolius* as figured by Butcher, *l.c.* It is necessary, therefore, always to examine the epidermal cells of the stem before making a decision in such cases. As the stem of *P. acutifolius* is more flattened than that of any other species of the genus it is not difficult to do this under the high power of the microscope. The cells of *P. zosterifolius* are always short, 1½-3 times as long as broad. Those of *P. acutifolius* are constantly long, 4-6 (or more) times as long as broad. I recently collected from a pool near the R. Ouse between Barcombe Mills and Lewes, Sussex, plants which I put in my vasculum as *P. zosterifolius*. There were no fruits or winter-buds present, but microscopic examination showed them to be certainly *P. acutifolius*. The older leaves were up to 5 mm. wide, *blunt* and abruptly cuspidate, but the younger leaves were more acute. In view of the difficulty in separating this form of *P. acutifolius* from the similar *P. zosterifolius*, I shall be pleased to examine any such doubtful forms as may be sent to me. W.H.P.

753/19. CAREX FULVA Host. *C. Hostiana* DC. This species continues to be confused with *C. binervis*, especially when the latter is immature. A most useful diagnostic character is the female glume. In *C. fulva* this has broad silvery-white hyaline margins. The midrib does not reach the apex, which is therefore *not* mucronate, *entire* and *smooth*. On the contrary, the glume of *C. binervis* has narrower scarious margins, the midrib is exserted (making the glume mucronate), and the apex is eroded, denticulate, and often ciliate. In dealing with doubtful plants it is, therefore, well worth the trouble to detach one or two uninjured glumes and to examine them under a microscope. *C. fulva* also has the male spikelets smaller and more acute; the female spikelets shorter and more remote than those of *C. binervis*.

†763/3. ✠SORGHUM CERNUUM Host. Avonmouth Docks in W. Gloster, 1933, J. GIBBONS. The "White Durra" of trade. Not in the Oxford List.

Extracted from *The Journal of Botany*, 1933.

185/8(2). ✠RUBUS NOBILISSIMUS W. Wats., described as subspecies of *R. opacus* Focke in *J.B.*, xxxi, 132, 1933.

185/40(2). ✠RUBUS RHODANTHUS W. Wats. in *J.B.*, xxxi, 223 seq., 1933.

396/9. ✠CIRSIUM PALUSTRE (L.) Scop. × TUBEROSUM (L.) All. = C. SEMIDECURRENS Richter, Nash Point, Glamorgan, v.-c. 41, J. L. Bruce, vide Gilmour, *J.B.*, xxxi, 17, 1933.

416/9. ✠CREPIS FOETIDA L., var. a. VULGARIS Bisch., vide Drabble in *J.B.*, xxxi, 63, 1933.

✠Var. b. HISPIDA Bisch., vide Drabble in *J.B.*, xxxi, 63, 1933.

543/17(2). ✠VERONICA PRAECOX All. First record for Britain, near Barton Mills, W. Suffolk, v.-c. 26, 16th April 1933, J. E. Lousley, vide A. J. Wilmott in *J.B.*, xxxi, 159, 1933.

545/12. ✠EUPHRASIA FRIGIDA Pugsl., *J.B.*, xxxi, 86, 1933. This name was proposed in substitution of the invalid *E. latifolia* Pursh in *Revision of the British Euphrasias, Journal Linn. Soc.*, xlviii (1930), 490, footnote.

✠Var. b. LAXA Pugsl., *J.B.*, xxxi, 307, 1933.

545/15. ✠EUPHRASIA MICRANTHA Reichb., var. b. JOHNSTONII Pugsl., *J.B.*, xxxi, 85, 1933.

545/19(4). ✠Euphrasia anglica Pugsl. × Pseudo-Kerneri Pugsl.. Friday Street, Surrey, September 1899, in Herb. C. E. Salmon, Pugsley in *J.B.*, xxxi, 89, 1933.
Lxxi

573/1. ✠Prunella vulgaris L., var. e. pallida Gilmour, *J.B.*, xxxi, 321, 1933. A low-growing form from Kenfig Burrows, Glamorgan, v.-c. 41, with small flowers of a pale bluish-mauve colour and no purple coloration in the calyx and bracts.

615/. Polygonum. In a paper entitled "British Polygona, Section *Persicaria*," *J.B.*, xxxi, 90-98, 1933, Mr C. E. Britton revises the British forms of this section of the genus. The following forms, varieties and hybrids are additions to the British Plant List.

615/5. ✠Polygonum amphibium L., var. d. natans Moench, vide Britton in *J.B.*, xxxi, 91, 1933.
✠Var. e. decumbens Klett. & Richt., vide Britton in *J.B.*, xxxi, 91, 1933.
Lxxi

615/6. ✠Polygonum lapathifolium L. (scabrum Moench), var. a. genuinum Gren. & Godr., vide Britton, *loc. cit.*, 93.
✠Var. d. angustifolium Peterm., vide Britton, *loc. cit.*, 93.
✠Var. e. ruderale Schuster, vide Britton, *loc. cit.*, 93.
✠Var. f. tomentosum Beck, vide Britton, *loc. cit.*, 93.
(?=var. b. *incanum* Lej. & Court.).

615/6. ✠Polygonum lapathifolium L. × Persicaria L., Britton, *loc. cit.*, 96.

615/7. ✠Polygonum Persicaria L., var. g. prostratum Bréb., vide Britton, *loc. cit.*, 92.

615/8. ✠Polygonum nodosum Pers. (petecticale Dr.), var. b. [incrassatum Rouy], forma stenophyllum C. E. Britton, *loc. cit.*, 94.
✠Var. c. ovatum A. Braun, vide Britton, *loc. cit.*, 95.
✠Var. d. erectum Rouy, vide Britton, *loc. cit.*, 95.
✠Var. e. inundatum C. E. Britton, *loc. cit.*, 95.
✠Var. f. Brittingeri (Opiz) C. E. Britton, *loc. cit.*, 95.

615/9. ✠Polygonum Hydropiper L. × mite Schrank, Britton, *loc. cit.*, 97.

615/11. ✠Polygonum minus Huds., var. a. commune A. Br., Britton, *loc. cit.*, 98.
✠Var. b. latifolium A. Br. (1824), replacing elatum Moss (1914), Britton, *loc. cit.*, 98.

737/2. Potamogeton polygonifolius Pourr. × praelongus Wulfen = P. Macvicarii Ar. Benn., this name to be deleted from the List. W. H. Pearsall in *J.B.*, ~~x~~xxi, 45, 1933.
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Extracted from Col. Godfery's *Monograph of the British Orchidaceae.*

668/1. ✠Epipactis palustris Crantz, var. c. ochroleuca Barla, Godfery, *Monograph and Iconograph of Native British Orchidaceae*, 61. Flowers yellowish-white, lip pure white; Freshfield, Lancs, and Kenfig, Glamorgan.

668/2. ✠Epipactis latifolia All., var. e. purpurea Celak., Godfery, *loc. cit.*, 65. "Flowers dirty red-purple."

668/2. ✠Epipactis latifolia All. × leptochila Godf. = × *E. Stephensonii* Godf., in Monograph, *loc. cit.*, 76.

668/4. ✠Epipactis violacea Dur. Duq., var. purpurata (Sm.) Godf., in *Monograph*, *loc. cit.*, 68. Godfery applies the name *violacea* Durand Duquesnay to the species, reducing Smith's *purpurata* to varietal rank. *Purpurata* is said to be based on a single specimen "glowing with a beautiful red-lilac colour." Godfery suggests that this brighter colouring is due to saprophytism.

668/7c. ✠Orchis incarnata L., var. pulchella Dr. × latifolia L., *loc. cit.*, 189.

668/7c. ✠Orchis incarnata L., var. pulchella Dr. × praetermissa Dr., *loc. cit.*, 191.

668/7d. Orchis incarnata L., var. dunensis Dr. × praetermissa Dr., *loc. cit.*, 192.

669/3. ✠[Orchis Simia Lam.], var. b. macra (Lindl.) Godf., *loc. cit.*, 166. Godfery differentiates between the English and Continental plants, placing the former as a variety and using Lindley's specific name. It differs from the type by its darker, more grey-green leaves, more cylindrical spike, bluer lip-segments, broader mid-lobe with smaller spots, and whiter spur.

669/6. ✠Orchis latifolia L. × praetermissa Dr., *loc. cit.*, 202.

669/6. ✠Orchis latifolia L. × maculata L. (Fuchsii Dr.) = × *O. Braunii* Halacsy, *loc. cit.*, 201.

669/6. ✠Orchis latifolia L., var. b. eborensis Godf., *loc. cit.*, 219. A dwarf form from Yorkshire and Durham.

669/6b. ✠Orchis latifolia L., var. eborensis Godf. × maculata L., *loc. cit.*, 220.

669/7. ✠Orchis incarnata L. × latifolia L. = × *O. Aschersoniana* Hausskn., *loc. cit.*, 188.

672/3. ✠Ophrys apifera L., var. albida Garnier & Poulter, *loc. cit.*, 238. Labellum normally coloured, sepals white. This name was proposed by P. M. Hall in *Rep. B.E.C.*, 451. 1930.

NOTES ON PUBLICATIONS, NEW BOOKS, ETC., 1933.

PLANTS AND HUMAN ECONOMICS, by Ronald Good, M.A. (Cantab.), Head of the Department of Botany, University College, Hull. With 8 maps, xii + 202, price 5/-. Cambridge University Press, 1933. This is an outstanding book in many ways—it meets a pressing and long-standing need; is packed with most reliable information unavailable in similar form elsewhere; is written in an admirable and readable manner, and is printed in excellent type. Considering its manifold attractions I am surprised at its cheapness. I strongly advise any person who reads these lines to procure a copy without delay. As I have been vainly looking for a book of this character for many years my personal reaction to it was one of delighted welcome.—W.H.P.

From the Preface we learn that "It is remarkable that the aspect of botany most intimately concerning human affairs and activities, economic botany, is the aspect least taught. The fact remains that in the educational circumstances of to-day there is often a tendency for botany to be regarded merely as a constituent of certain scholastic fences which have to be surmounted before what is popularly supposed to be open country is reached. The student's view of the science tends to be bounded by a syllabus, and of its implications he learns little. My object has therefore been to combine in small compass not only the botanical facts but also the frequently more important historical and economic facts required to give to those who begin the scientific study of botany an adequate humanistic background of reality to their subject. I have tried to give them the evidence that the science of plants is something more than a mere mental discipline. Although this book is intended primarily for those in the senior classes of schools and the junior classes of universities, I have been at some pains to make it also of potential value to those who do not happen to be students of biology."

TRANSACTIONS OF THE BOSE RESEARCH INSTITUTE, CALCUTTA. Vol. vii, 1931-32. Edited by Sir J. C. Bose, F.R.S. Longmans, Green & Co., 1933. 25/- net. 343 pp., with 161 illustrations. Whilst the majority of the papers comprised in this volume relate to further investigations of the motile and conducting mechanisms of plants, in continuation of the work described in previous volumes, there are also chemical, zoological and anthropological papers. This volume will therefore appeal to a wider public than did its predecessors, and can be most highly commended. Of the 17 chapters 13 are botanical and many of these are of absorbing interest to British readers. Of the remainder the chapter on The Fish-eating Spiders in Bengal is a fascinating study. To the writer of this review the second chapter made an immediate appeal: it is entitled Capture of Fish by Drugging a Stream and describes how large quantities of fish used to be captured in the hill-streams of Darjeeling by the Lepcha fishermen applying to a stream extracts from the stems, roots, and fruits of various plants. The fish, though regarded as poisoned, prove, nevertheless, to be safe as human food. "Clearly the plant-extract works not as a diffuse protoplasmic poison, but acts locally on some definite organ and function. The present investigation was undertaken to ascertain what this organ might be, and how it is rendered inactive." It was found that the main effect of the introduction of extracts was a local paralysis of the respiratory activity: the fish can be revived by artificial respiration.

The experiments were extended to the various gases and solutions which have a fatal effect on fish. The results of exact and lengthy experiments with Coal Gas, Sulphuretted Hydrogen, Carbon Disulphide, Copper Sulphate Solution and Potassium Cyanide are given in detail, and are of great value. Chapter eight, on the Modifying Effect of Change of Environment on the Irritability of *Neptunia oleracea* will be read with great interest by all botanists of discernment. The volume is excellently produced and should be widely appreciated.

The Flora of the Clyde Area: A Handbook of the Flowering Plants and Ferns occurring Wild or Established within the Drainage Area of the River and Firth of Clyde, by John R. Lee. F'cap. 8vo., pp. xvi + 391. Glasgow: John Smith & Son (Glasgow), Ltd., 1933; 7/6 net. It is now more than 40 years since the late Prof. King's revision of Hennedy's *Clydesdale Flora* was published and this has been long out of print. A modern guide giving the results of local field-work and the general advance of botanical knowledge is therefore extremely welcome. The area included in the Flora is practically that of the *Handbook* issued in 1901 on the occasion of the meetings of the British Association at Glasgow, and is thus described by the author:

This embraces the whole of the land surface draining to the river and firth of Clyde, and comprising the political counties of Lanark, Renfrew, Dumbarton, and Bute, together with large parts of Ayrshire, Stirlingshire, and Argyll, a portion of western Perthshire, and small fragments of West Lothian, Peeblesshire, Kirkcudbrightshire, and Wigtonshire. The area as thus defined, is characterised by great variety and scenery, well marked geological zones, a considerable range of altitude and much diversity of surface features, with a corresponding wealth and variety of plant species. The line of the great fault, which divides Scotland naturally into its two historic regions of Highland and Lowland, passes through the middle of the Clyde area, crossing the Isle of Bute, the eastern extremity of the Cowal district of Argyll and the southern end of the Rosneath peninsula, and extending across Loch Lomond from below Luss to the Conic Hill behind Balmaha.

North and west of this line the flora differs considerably from that of the southern and eastern portion of the area. In the high ground included within this northern part many of the "alpine" plants characteristic of the richer mountains of central and northern Scotland occur, and the flora generally is of a distincly boreal and sub-arctic type. Extensive stretches of peat-moor and of heath and hill-pasture are found; and the natural woodlands are mostly of Oak and Birch, with their usual associates. In the lowland area a large proportion of the ground is under cultivation; but a considerable part consists of grass-moor, heath, and peat-moor also. Great tracts of country of this nature are found on the uplands of Lanarkshire and Ayrshire, where stretches of boggy ground dominated by grasses, sedges, and similar plants extend for long distances. Woodlands of considerable extent, however, occur in the lower-lying parts, and along the banks of the Clyde and its numerous tributaries; and here a rich variety of sylvan vegetation is to be found. The maritime flora is of a varied character and many of the most interesting plants typical of the western sea-board of Britain are found along the shores of the Firth and on the island.

The book contains brief and admirable descriptions of Orders and Genera. Where a genus contains more than one local species a Key to enable these to be easily distinguished is provided. The descriptions of the various species are quite good, admirably worded, and fairly complete. An exhaustive Glossary of Botanical Terms at the end of the book enables the student to understand the text without reference to another volume. At the end of each specific description are short but valuable notes on habitats and distribution. Two features of especial interest to the writer are noted: the inclusion of many established species and the suppression of actual localities in the case of the rarer species. There is a growing demand for the full description of the commoner alien plants in our native floras. They are so frequently met with and cause so much trouble in identification to the amateur botanist that we welcome any attempt to help in this direction. The general presentation of the *Flora* is excellent and the price very reasonable. In view of the prohibitive additional cost of providing an adequate coloured map we consider its omission a wise choice. My own experience of such maps is that they very soon become a liability rather than an asset and, if folded, often indeed a nuisance. W. H. P.

THE FLORA OF THE LIVERPOOL DISTRICT, edited by C. Theodore Green, M.R.C.S., L.R.C.P., D.P.H. Arbroath, T. Buncle & Co., 1933. Price, 20/-. xi + 163; illustrated by drawings and photographs. The plan of this volume differs materially from that of the usual district or county Flora, its most conspicuous feature being a series of 791 illustrations of species. These are, on the whole, most carefully drawn and will appeal to botanists in general as they represent the majority of the commoner British species. The letterpress is reduced to a minimum, few localities being given, and no collectors' names. The nature of the habitat and the local frequency receive brief notice. Special chapters on Geology, Meteorology, The Sand Dunes, The Mosses, Heaths, and Estuaries of the district are added, and there is an excellent series of photographs of typical plant associations or other noteworthy scenes. The printing and general presentation are both extremely good and the Flora forms a handsome volume.

Plant Physiology: With Reference to the Green Plant, by Edwin C. Miller, Professor of Plant Physiology, Kansas State Agricultural College, and Plant Physiologist, Kansas Agricultural Experiment Station. 900 pages, 6 × 9, 38 illustrations. McGraw-Hill Publications. 42/- net. This book gives a complete survey of the field of plant physiology in a comprehensive and minutely detailed treatment that makes it suitable both as a text for advanced college students and as a reference work for investigators. The work is confined entirely to the physiology of the green plant; the findings of the leading American, English and Continental investigators are summarised. Review questions and unusually complete bibliographies follow each chapter.

Plant Sociology, by J. Braun-Blanquet. Translated, revised and edited by G. D. Fuller and H. S. Conrad. McGraw-Hill Publications. 27/- net. Essentially an ecological study of plant communities in which there is an attempt made not only to analyse the climatic, chemical and physical factors which control vegetation, but also to evaluate the vegetation itself in a quantitative manner. Emphasis is placed on the intimate relationship of different species as members of the plant community. These social relationships are shown to have a decided influence in determining the composition and succession of plant associations.

Plant Ecology, by John E. Weaver, Professor of Plant Ecology, University of Nebraska and Research Associate in Ecology, Carnegie Institution of Washington, and Frederic E. Clements, Associate in Ecology, Carnegie Institution of Washington. 520 pages, 6 × 9, 262 illustrations. McGraw-Hill Publications. 30/- net. A comprehensive textbook for students of plant ecology and a guide for workers in related fields, written from the standpoint of development, instrumentation, and experiment. The book discusses the intimate relations between plants or groups of plants and their environment—the relations of plant to habitat, whether the latter be natural or modified by cultivation. Experiments and exercises for greenhouse and laboratory are outlined in detail and field studies are suggested.

Principles of Genetics: An Elementary Text, with Problems, by Edmund W. Sinnott, Professor of Botany and Genetics, Connecticut Agricultural College, and L. C. Dunn, Geneticist, Connecticut (Storrs) Agricultural Experiment Station. 431 pages, 6 × 9, 138 illustrations. McGraw-Hill Publications. 21/- net. The object of this book is to set forth the essential principles of genetics in as clear and concise a manner as possible. The fact that one of the authors is a botanist and the other a zoologist makes for a well-balanced, well-rounded treatment. Distinctive features of the book are its Questions for Thought and Discussion, its Problems, and its Reference Assignments, all aimed to induce the student to think independently and apply for himself the principles discussed in the text.

CYTOLOGICAL TECHNIQUE, by John R. Baker, M.A., D.Ph. 1933; Methuen & Co., Ltd. F'cap 8vo. 3/6 net. This small but excellent manual is written primarily for advanced students in Zoology and Comparative Anatomy and meets a pressing need in thoroughly explaining to the student exactly what he is doing and why the various fixatives and other fluids he uses are to be preferred to others or even to different proportions of the same. Instead of working mainly or altogether in the dark he should possess a full knowledge of the substances used, of the possibility of reactions between them and of the results of choosing particular substances and mixing them in certain proportions. The number of methods recommended is reduced to a minimum but each is one of the best of its kind and is described in the fullest detail. Fortunate indeed will be the student who has thoroughly made himself master of those here included. He should certainly then be able to appreciate other existing methods and possibly to improve on them by one of his own. The book can be unreservedly recommended.

RESPIRATION IN PLANTS, by Walter Stiles, M.A., Sc.D., F.R.S., and William Leach, M.Sc., Ph.D. Methuen & Co., Ltd. F'cap 8vo. 3/6 net. This is by far the best presentation of the subject I have seen, and I read it through with sustained interest before even glancing at the Preface—an inversion of the usual order. However, I subsequently discovered that the opening page contained a remarkably accurate description of the impression produced by my reading—set out as the *object* of the authors. It is seldom that the authors' avowed aim strikes the reader so exactly as intended. No words of mine would more clearly summarise the nature of the impressions produced—" In the present book we have aimed at giving an account of the nature of plant respiration which is readable and understandable by the elementary student of botany and which at the same time contains sufficient information to render it of value to the advanced student. We have throughout endeavoured to indicate the principles of plant respiration rather than to catalogue a mass of detailed observations from researches often of very dubious value." From the reader's point of view these objects are splendidly achieved and the authors are to be heartily congratulated on so excellent a summary of modern knowledge on this important subject.

PLANT ECOLOGY, by Dr William Leach. Methuen & Co., Ltd. 1933. F'cap. 8vo. 3/6 net. This is another of Methuen's Monographs on Biological Subjects—a series worthy of the highest praise. As Ecology is, for the greater part, an outdoor study, a modern development on more exact scientific lines of " field botany," and one of its future main lines of advance, this volume will be warmly welcomed. Again and again we are asked " What is Ecology?" and there is an obvious and increasing desire for information as to its methods and aims. In this small and admirable book will be found as concise, clear and comprehensive a treatment of the modern aims of the ecologist as could possibly be desired. Having read it with the greatest interest and enjoyment I can unreservedly recommend it to our members. If I may be permitted a suggestion, it is that the last chapter on " British Vegetation " should be expanded to form an additional volume to this excellent series.

THE FLORA OF LEICESTERSHIRE AND RUTLAND, by Arthur Reginald Horwood, F.L.S., and the late Charles William Francis Noel, third Earl of Gainsborough. Crown 8vo., pp. ccxcvii, 687, 32 pls., 2 folding maps. Oxford University Press, Milford: London, 1933. Price 35/-. A great achievement. Mr Horwood must be heartily congratulated upon the completion of this large and comprehensive volume by September 1933, the date of the meeting of the British Association at Leicester. Even with unlimited leisure such an undertaking would have been great but it became doubly difficult in restricted time. Its successful accomplishment under the latter conditions is, therefore, a striking tribute to Mr Horwood's ability, industry and determination.

One is impressed at the outset by the enormous amount of information the work contains. The Introduction includes chapters on Soils, The Relation of Agriculture to Natural Vegetation, Altitude and Vegetation, Geology, Rivers, Botanical Districts—Charnwood Forest and the Woodlands of outstanding botanical interest—Climate and Meteorology, Natural Types of Vegetation, the History of Botanical Research, and Biographies. Each county is separately treated. Then follow a Plan of the Flora, notes on the Libraries and Herbaria consulted, and a lengthy Bibliography. The treatment of the Botanical Districts is exceptionally good—upon modern lines—but after reading through the 297 pp. of the Introduction the conclusion was inevitable that the enforced omission—from lack of space—of the " ecological details of some 160 species " (referred to in the Preface) might have been avoided by curtailment of the space given to Botanical Research and Biographies. As the ecological treatment throughout is one of the most valuable features of the volume we should have been greatly pleased to have seen it thus extended.

The second part of the book is occupied by the Flora (pp. 1-683) which is admirably arranged. The details of distribution are very fully given; and the notes on habitat and the frequent comparative descriptions of similar plants are both excellent. The names given to some of the genera are unfortunate—Cervicina, Cammarum, and Capnoides rather than Wahlenbergia, Eranthis and Corydalis respectively. The latter names are certainly given as synonyms but we note that the author says that the generic names are " as far as possible cited in accordance with the law of priority." The last three names, however, are included in the " Nomina Conservanda " and should take precedence over the earlier synonyms adopted. Incidentally, in this connection we noted that not one of the generic names—Cammarum, Eranthis, Helleborus, Aquilegia and Nigella—given on p. 21 is included in the Index.

The volume is well illustrated by maps, diagrams of regional surveys, and admirable photographs of typical aspects of vegetation. The printing and presentation are alike excellent—even the smallest type sometimes necessarily employed being singularly clear. We have seldom seen a volume in which the use of so many different kinds of type has been more happily justified. The Flora has certainly set a high scientific standard and has our warmest commendation.

RECENT DISCOVERIES IN THE NEWFOUNDLAND FLORA, by Prof. M. L. Fernald. Reprinted from Rhodora, Vol. xxxv, Nos. 409-420, January-December 1933. Pp. 403, with 43 full-page photographic plates and several maps of distribution. This is an exceptionally fine volume whose general presentation reaches an extremely high standard and leaves us a little envious. In a brief review it is impossible to do more than indicate some points of great interest to British botanists which the volume contains. Noteworthy additions to the flora of North America are *Cardamine flexuosa* With., and our familiar Barren Strawberry, *Potentilla sterilis*, discovered in Newfoundland. Here also many unglaciated tablelands were explored and their flora of endemic relic-species studied and recorded. *Ruppia maritima* is treated in accordance with the revision of this species by Fernald and Wiegand—Rhodora xvi, 119-127, t. 110 (1914), and a Key to the eastern American forms of *Festuca rubra* is given. On pp. 168-185 is a detailed account of *Agropyron* in the same area. The American variations of the ubiquitous *A. repens* (L.) Beauv. are fully described and splendidly figured (Pl. 245). *Juncus conglomeratus* L. appears as a var. of *J. effusus* on p. 233, and the author finds himself "unable to follow the extreme segregations of *J. alpinus* recently proposed in Europe," and gives reasons why the name *J. alpinus* should be preferred to that of *J. alpino-articulatus* Chaix (pp. 234-5). A new hybrid ×*J. alpiniformis* (*J. articulatus* × *alpinus*) growing with typical and fertile *J. alpinus* Vill. and *J. articulatus* L. is given on p. 235, but this hybrid has been recorded as British and already has a name ×*J. Buchenaui* Dorfl., see *Rep. B.E.C.*, 1930, 373.

We note that Fernald retains the name *Habenaria* for all the divisions of this genus. *H. straminea* being closely related to *albida* would be placed with *Gymnadenia* by Godfery. An interesting account of the American species of *Euphrasia* is found on pp. 298-307. The author deals with the names *E. arctica* Lange and *E. latifolia* Pursh at considerable length and concludes "Surely if there is any doubt whatever (which I am unable to discover) regarding the exact identity of *Euphrasia arctica* Lange, there is hopeless doubt regarding the exact identity of *E. frigida* Pugsley—as 'a substitute without any type designated for *E. latifolia* Pursh ex Wettstein." He also shows that *E. americana* Wettst. is quite distinct from *E. brevipila* Burnat & Gremli. On pp. 369-386 is a long and interesting article on the species of *Taraxacum* in Eastern America. This is illustrated by fine photographic plates and an elaborate Key. "If we could see with the eyes of some Scandinavian and English botanists we should recognise in *Taraxacum palustre* many scores of species. Every slight divergence in the cutting of the leaves or the color of the corollas or the shade of the achenes would become a 'species.' Personally I can match the specimens on the lawn outside my window with authentic sheets of ten of Dahlstedt's 'specific' propositions. Genetically they are not species nor anything but trivial variations which, under normal sexual reproduction, would quickly be lost in a common blend. Unless the *Taraxaca* have very real and deep-seated differences of involucre, flower and fruit, and definite geographic segregation, it seems like stultification of science to treat them as species. We must not ignore the facts that all plastic and modern species consist of innumerable minor trends, but that these slight tendencies are utterly different from the true ('Linnean') species which, through millions of years, have stood the long test of competition and physiographic change."

We have given this quotation at some length, but must take exception to its first sentence. No English botanist of repute would to-day "see" as Prof. Fernald imagines, but most of them would rather endorse the main argument here advanced. The article contains valuable information as to the most important characters of these plants. "The most fundamental character in *Taraxacum*, it seems to me, is in the mature achene, whether tuberculate its entire length or only at the summit, whether with a slender or thick pyramid, and, lastly, rufescent or drab. The color is less satisfactory than the other characters, since it often changes as the fruit matures. The length of the filiform beak is, also, a very satisfactory character. Consequently, for really satisfactory study, *ripe fruit* is essential. Much immature or merely flowering material can be placed only approximately. The characters of the involucre are next in importance, whether with many or with few or no bracts corniculate." As regards nomenclature *T. palustre* (Lyons) Lam. & DC. replaces *paludosum* Schlecht., and *T. palustre*, var. *vulgare* (Lam.) Fern. apparently = *officinale* Web. *T. lapponicum* Kihlman replaces *T. croceum* Dahlst.

Under *Carex*, *C. incurva* Lightf. is renamed *C. maritima* Gunner and *C. alpina* Swartz gives way to *Vahlii* Schkuhr. *C. alpina* Swartz (1798) is invalidated by the earlier *C. alpina* Schrank (1789) and *C. alpina* Honck. (1792). *C. Halleri* Gunnerus, *Fl. Norr.*, ii, 106 (1772), clearly antedates the name of Swartz, but Gunnerus obviously had no material himself; his species was based on Haller's 1356 and his brief diagnostic phrases were taken directly from Haller's description of it. Chief weight should therefore be given to Haller's very full description and from this it is abundantly clear that it has nothing to do with *C. alpina* Swartz. This is a further instance—if one were necessary—of the folly of making a fetish of priority. Paradoxical as it may appear, priority is of secondary importance, to validity. When you have made a list of all legitimate names to be considered then priority functions. *C. Halleri*—a *nomen confusum*—would not appear on such a list.

Exigencies of space prevent a fuller reference to the many subjects dealt with in this most interesting volume. It marks a high standard of scientific achievement and is a valuable contribution to the best botanical literature. W. H. P.

Wild Flower Magazine. We have the greatest admiration for the high ideals and self-sacrificing labours of Mrs Dent and her talented colleagues and wish them still further success in their efforts to help others to appreciate the beauties of the countryside. It is a great pleasure to read through the reports of the various branches of the W.F. Society and to note the fine spirit of kindly service which pervades them and to estimate the substantial addition to human happiness which they suggest. Who can over-assess the amount of real joy the compilation of those individual diaries must have yielded? We were impressed also with the extent and value of the contribution to our present knowledge of the distribution of British plants which is here revealed and we gladly acknowledge the help which the Wild Flower Society is making toward the completeness and accuracy of existing records.

Among the many items of excellent advice with which the pages of the Magazine abound we noticed one which so perfectly expressed our own ideas that we trust Miss Hilda Salmon will allow us to reproduce it, " Go on sending me your doubtful plants and telling me what you think they are." Here you have embodied the offer of kindly service contingent upon the applicant's own preliminary individual effort. A well-known axiom in education is " Never do for a child what that child can—with a fair effort—do for itself." This is a principle capable of wide-spread application and we are quite certain that many of our own referees will be grateful for its reproduction here. May we also indulge the hope that it may catch the eye of some of our members who can appreciate its subtle implications.

W. H. P.

ABSTRACTS OF PAPERS BEARING ON THE STUDY OF THE BRITISH FLORA, 1933.

A. J. Wilmott and J. S. L. Gilmour.

INTRODUCTORY NOTE.

The authors regret that, owing to pressure of work, it has not been possible to expand these abstracts on the lines mentioned in the last Report. It is hoped, however, that the following notes, though incomplete and somewhat compressed, will be of use to British botanists.

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1. Akerlund, E. "En fribladig *Primula veris*." *Bot. Not.* (1933), 271-278. Description and illustrations of a plant with free sepals and petals.

2. Alm, C. G., and Weimarck, H. "*Typha angustifolia* L. × *latifolia* L. funnen i Skane." *Bot. Not.* (1933), 279-284. The hybrid is described and figured; it or similar hybrids should be sought in Britain.

3. Barnes, B. "Notes on *Lathyrus Aphaca* L." *Journ. Bot.*, lxxi, 10-15, 25-33. A full account is given of forms in which the stipule ends in or bears a small leaflet. The pods may be yellowish or brown. The testa may be purple-black or variegated with yellow; diagrams are given of two plants which bore both kinds and intermediates.

4. Brenchley, W. E., and Heintze, S. G. "Colonisation by *Epilobium angustifolium*." *Journ. Ecology*, xxi, 101. An account is given of the differential colonisation by *Epilobium angustifolium* of experimental plots at Rothamsted which had received varying dressings of artificial nitrogen manures. The conclusion is reached that differential colonisation is due to varying degrees of competition rather than to hydrogen-ion concentration or other chemical factors.

5. Britton, C. E. "British *Polygona*, section *Persicaria*." *Journ. Bot.*, lxxi, 90. The British species are described with many varieties and hybrids. The following new names are given under *P. nodosum* Pers.:—f. *stenophyllum*, var. *inundatum* and var. *Brittingeri*.

6. Butcher, R. W. "On the Distribution of Macrophytic Vegetation in the Rivers of Britain." *Journ. Ecology*, xxi, 58. The author shows that the chief factor governing the distribution of the larger plants in running water is current. Torrential, non-silted, partly silted, and littoral communities are distinguished and correlated with the nature of the river bed. The quantity of vegetation is continuously reduced in rivers with large and sudden floods. The nature of the communities is modified by the Calcium content of the water, by excessive silting and by pollution. Observations are given on the perennation and permanency of the vegetation, and it is shown that the growth of macrophytic vegetation can considerably modify the physical condition of a river.

7. Cedercreutz, C. "Die Characeen Finnlands." *Mem. Soc. pro Fauna et Flora Fenn.*, viii, füz. 5, 241. The Finnish species of this family are discussed and a key to genera and species given.

8. Chater, E. H. "*Corynephorus canescens* Beauv. on the Moray Coast." *Journ. Bot.*, lxxi, 15 (short note). A few plants at Kingston-on-Spey and one west of Lossiemouth (Elgin).

9. **Conway, V. M.** "Further Observations on the Saltmarsh at Holme-next-the-Sea, Norfolk." *Journ. Ecology*, xxi, 263. Additional observations and experiments on this area since Peace published his paper (1928) are recorded. A map of the present state of the vegetation is given and several tentative suggestions on the course of the succession are put forward.

10. **Corradi, R.** "Anomalie Dell' '*Equisetum maximum* L.'" *Nuovo Giorn. Bot. Ital.*, xl, 127. An abnormal form of this species, with fasciated fertile spikes, is described.

11. **Drabble, E.** "Note on *Chenopodium glaucum* L." *Journ. Bot.*, lxxi, 7-9. The edge of the seed is not acutely keeled as often described, but rounded. An entirely spreading plant (I. of Wight) seems to be var. *prostratum* Beck. The leaf varies—obtuse to acute—and may be very small, narrow and acute (var. *microphyllum* Murr. I. of Wight).

12. **Drabble, E.** "The Genus *Crepis* in Great Britain, II." *Journ. Bot.*, lxxi, 57-63. A key to the species is given, followed by descriptions of the British species.

13. **Dymes, T. A.** "The Germination of *Euphorbia Cyparissias* L." *Journ. Bot.*, lxxi, 321/2 (short note). The seeds (ovoid—not "globose") failed to germinate until sown after removal of the elaiosome, when a small percentage germinated.

14. **Feher, J.** "Kleistogamie an Papaver-Arten." *Bot. Közlemények*, xxx, 194. In June 1932 the author found *Papaver dubium*, *P. Rhoeas*, and *P. somniferum* with cleistogamous flowers. The stamens and style ripen in bud, autogamy takes place, and fruits are developed which have the petals and even the sepals adhering to them. The phenomenon is probably due to wet, cold weather.

15. **Gertz, O.** "Till Kännedomen om *Cuscuta europaeas* värdväxtflora." *Bot. Not.* (1933), 505-508. A long list of host plants observed in Skäne is followed by a discussion.

16. **Gilmour, J. S. L.** "Notes from Glamorgan." *Journ Bot.*, lxxi, 16-17 (short note). *Rumex rupestris* Le Gall and *Cirsium tuberosum* All. × *C. palustre* Scop.—new to the county.

17. **Gilmour, J. S. L.** "New Variety of *Prunella vulgaris*." *Journ. Bot.*, lxxi, 320/1 (short note). A small, pale flowered plant with green bracts is described as var. nov. *pallida*.

18. **Godwin, H., and Turner, J. S.** "Soil Acidity in Relation to Vegetational Succession in Calthorpe Broad, Norfolk." *Journ. Ecology*, xxi, 234. This broad is surrounded by concentric plant communities consisting of (a) reed swamp, (b) carr, and (c) woodland. These are considered to represent stages in a primary hydrarch succession which is still in progress. The ground becomes gradually higher and the Ph value decreases from the edge of the alkaline broad inland, and extensive *Sphagnum* undergrowth occurs in carr, in mown marshes and in pastures. It is suggested that the

broads represent an intermediate stage between typical Hochmoor and deciduous forest climaxes.

19. **Gross, H.** "Die Eibe in Ostpreussen." *Beih. bot. Centralb.*, 50, ii, 552-576. Full records with map of the distribution of *Taxus baccata* L. in East Prussia.

20. **Gupta, P. S.** "Reaction of Plants to the Density of Soil." *Journ. Ecology*, xxi, 453. Experiments are described showing that the mechanical properties of soil as determined by its texture have considerable effect on plant growth, especially on the growth and development of the root system. *Mercurialis perennis* was especially studied.

21. **Gustafsson, A.** "Zur Entstehungsgeschichte des *Rubus Bellardii* Whe. & N." *Bot. Not.* (1933), 231. The distribution (map) and cytology (figures) have been investigated. The species is highly constant and widely spread, but the chromosome number at somatic metaphase is constantly 35: it can therefore scarcely develop fertilised egg cells, and is of hybrid nature.

22. **Jackson, A. B. & A. K.** "Alderney Plants." *Journ. Bot.*, lxxi, 106 (short note). Several additions are made to the list published by Marquand in 1900.

23. **Juby, D. V.**, and **Pheasant, J. H.** "On Intermittent Germination as Illustrated by *Helianthemum guttatum* Miller." *Journ. Ecology*, xxi, 442. Experiments are described showing that the seeds of this species are dimorphic, types with "hard" and "soft" testas being present. The latter germinate within a few days of sowing, while the former show very varying degrees of permeability and hence exhibit a remarkably discontinuous germination, lasting for as long as 300 days.

24. **Knudson, L.** "Non-symbiotic Development of Seedlings of *Calluna vulgaris*." *New Phytol.*, xxxii, 115-126. Seed free of fungus germinated and developed roots on various culture media.

25. **Lemberg, B.** "Uber die Vegetation der Flugsandgebiete an den Küsten Finnlands." *Acta Botanica Fennica*, xii. The vegetational succession on the moving sand dunes of the Finnish coast is described, many British species being mentioned.

26. **Levan, A.** "Uber das Geschlechtschromosom in *Sedum Rhodiola* DC." *Bot. Not.* (1933), 195-197. The species has 2n = 22 chromosomes (figured), one pair unequal in size (heterochromosomes regarded as sexual heterozygoty).

27. **Marro, G.** "Il Riconoscimento Delle Specie Italiane Del Genere '*Equisetum*,' Fondato Sui Carattari Anatomici Dell' Appurato vegetativo." *Nuovo Giorn. Bot. Ital.*, xl, 94. The anatomical characters of the vegetative parts of the Italian species of the genus are fully described and a key is given based on these characters. The great majority of the species mentioned are British.

28. Marsden-Jones, E. M., and Turrill, W. B. "Second Report on the Transplant Experiments of the British Ecological Society at Potterne, Wilts." *Journ. Ecology*, xxi, 268. Meteorological data for 1930 and 1931 are given, and the detailed observations carried out on each of the five species since the last report are recorded. Several interesting general conclusions on the relation between plants and their environment are drawn from these observations.

29. Marsden-Jones, E. M. "Alleged Change of Colour in *Primula vulgaris*." *Journ. Bot.*, xxi, 17 (short note). Specimens planted upside down did not produce pink flowers next year, as has been alleged to happen.

30. Marsden-Jones, E. M., and Turrill, W. B. "Genetics of Petal Size and other Characters in *Silene maritima*." *Kew Bull.*, 1933, 357. It is shown that the pair of characters "fully developed" and "poorly developed" petals indicates a monohybrid genetic basis and segregates in F_2 in a ratio of 3 "fully" to 1 "poorly." The genetic basis of some dozen other characters is also discussed.

31. Marsden-Jones, E. M., and Turrill, W. B. "A Statistical Study of Characters in two Wild Populations of *Silene maritima*." *Kew Bull.*, 1933, 479. A statistical analysis is given of samples of two populations of *S. maritima* growing (1) on the Chesil Beach, and (2) on cliffs near Land's End. Character differences between the two populations are correlated with differences in environment. The full significance of this analysis will not be apparent till after the publication of comparable analyses on high mountain populations.

32. Marsden-Jones, E. M., and Turrill, W. B. "Notes on the Taxonomy of British Material of *Anthyllis Vulneraria*." *Journ. Bot.*, lxxi, 207-213. The authors have carried out extensive breeding experiments and studies of field populations with forms of this species. The genetical results appear in the *Journal of Genetics* (this year), and the taxonomic matters arising are dealt with here. The relations of var. *rubra* L. and var. *coccinea* L. are explained. the former probably including the grassland (often inland) red-flowered variation found, e.g. on Salisbury Plain, and the latter retained for the sea coast deeply coloured Cornish plant. The var. *Allionii* DC. is not British. Some pale yellow British plants are var. *ochroleuca* Corb. and the Par Harbour "Amaranth Purple" is near but not identical with *A. tricolor* Vukot. Descriptions of var. *luteo*, var. *ochroleuca*, var. *coccinea*, and "Amaranth Purple" in terms of Ridgway's colour standards are given.

33. Meyer, F. J. "Beiträge zur vergleichende Anatomie der Typhaceen (Gattung Typha)." *Beih. bot. Centralbl.*, 51, i, 335-376. The study includes our British species.

34. Minio, M. "Le Osservazioni Fitofenologiche Della Rete Italiana Nel, 1932 (Annata XI)." *Nuovo Giorn. Bot. Ital.*, xl, 453. The dates of flowering of a large number of species, many of them

British, in different Italian localities during 1932 are recorded, and the results analysed.

35. **Morison, C. G. T.** "The Composition of the Soils used in the Potterne Transplant Experiments and of Portions of *Centaurea* and *Silene* grown thereon." *Journ. Ecology*, xxi, 475. This account forms an addendum to the main Report, xxi, 268-93.

36. **Muntzing, A.** "Quadrivalent formation and aneuploidy in *Dactylis glomerata*." *Bot. Not.* (1933), 198-205. Of 33 plants examined 16 had 2n = 14, 9 plants 2n = 28, and 7 plants 2n = ± 28. One was trisomic, 2n = 29, and its progeny was investigated. Various kinds of open and closed rings occur in the tetraploid, *D. glomerata*. The diploid plants (2n = 14) are *D. Aschersoniana*, and intermediate hybrids occur. *D. glomerata* is cytologically unbalanced.

37. **Mussack, A.** "Untersuchungen über *Cystopteris fragilis*." *Beih. bot. Centralbl.*, 51, i, 204-254. A general investigation of the habitat of the plant and its characteristics is followed by an account of the germination and the effect thereon of various nutrient solutions, light intensities, and salts.

38. **Nestler, H.** "Beiträge zur systematischen Kenntnis der Gattung *Linum*." *Beih. bot. Centralbl.*, 50, ii, 497-576. The characters useful in the sub-division of the genus have been investigated and a general key to the main groups of species in the genus is given. Figures of series of petals of *L. angustifolium* Huds., *L. usitatissimum* L., and *L. perenne* L. are given on pp. 508/9, and of the stamens on pp. 524/5.

39. **Nilsson, A. F.** "Self and cross-fertility in *Festuca rubra* L., . . . *Poa pratensis* L., and . . . *Alopecurus pratensis* L." *Bot. Not.* (1933), 206-230, Engl. summary, 221-223. There is wide variation in this respect among different individuals of each species, and genotypical differences are considered responsible for this.

40. **Nilsson, F.** "Self-fertility in the Genus Lolium." *Bot. Not.* (1933), 563-576. *Lolium perenne* and *L. multiflorum* have a low average of self-fertility, while the annuals *L. remotum* and *L. temulentum* are highly or completely self-fertile. In the first two various gradations occur, and in *L. perenne* hereditary differences between individuals occur. "No correlation could be found between pollen development and the degree of self-fertility," but some insignificant positive correlation between pollen development and general fertility in free flowering was found. Inbreeding produced lethal and sub-lethal types, a recessive lethality being indicated by high mortality rate in certain families.

41. **Papp, C.** "Contributiuni La Sistematica Si Distributia Geografica a Genului *Melica* L. în România." *Bul. Grad. Bot. Si al Muz. Bot. Cluj.*, xii, 105. The Roumanian species, varieties and forms of the genus are enumerated, including *M. nutans* and *M. uniflora*.

42. Pearsall, W. H. "*Potamogeton MacVicarii* Ar. Benn." *Journ. Bot.*, lxxi, 45-47. Specimens collected by G. Taylor in the loch whence this supposed hybrid originally came are identical with the poor original material in Herb. Ar. Bennett and are considered to be *P. alpinus* Balb. There is no evidence of either *P. praelongus* or of *P. polygonifolius*.

43. Petch, C. P. "The Vegetation of St Kilda." *Journ. Ecology*, xxi, 92. An ecological survey of the vegetation of Hirta in the St Kilda group was made with particular reference to the future effect of the removal of the factors of grazing and cultivation. Special attention is paid to the areas affected by sea spray and by puffin colonies.

44. Petersen, H. E. "Om Behaaringen hos gronlandske og danske Individer af *Vaccinium uliginosum* L." *Bot. Tidskr.*, xliii, 251-256. A table of percentages of five categories of hairiness in Greenland (N.E., N.W., S.E., S.W.) and Denmark is given. The percentages vary in different areas, but all categories occur in each of these five areas.

45. Peterson, D. "*Stellaria media* L. [sic] × *Stellaria neglecta* Weihe." *Bot. Not.* (1933), 500-504. The hybrid is described and figured analytically between the parents. It is completely sterile. Chromosome numbers given were *S. media* 2n = "36-42"; "n = c. 20"; the author's investigations give *S. media* 2n = 44, *S. neglecta* 2n = 22. The author notes the description by Beguinot from Italy of several fertile hybrids between different forms of these two species.

46. Pettersson, P. "The Action of Extreme Temperatures on Species of *Viola* and *Lamium*." *Mem. Soc. pro Fauna et Flora Fenn.*, viii, 79. Genotypes of *Viola tricolor*, *V. arvensis*, *Lamium purpureum* and *L. amplexicaule* were grown in high temperatures in a greenhouse. Alterations in the anthocyanin content, size and shape of the corollas were recorded. *V. arvensis* grown at 38°-40° C. showed anomalies in the flowers evidently produced by the action of extreme heat in the early developmental stages of the flower. The possibility is discussed of extreme temperature changes producing similar effects in nature.

47. Philipson, W. R. "*Carex pauciflora* Lightf. in Lake District." *Journ. Bot.*, lxxi, 76 (short note). New record for Cumberland.

48. Pugsley, H. W. "A Monograph of *Narcissus*, sub-genus *Ajax*." *Journ. Roy. Hort. Soc.*, lviii, 17. A very full and elaborate monographic account, fully illustrated, of the sub-genus is given, including the native *N. Pseudo-Narcissus*, of which six new varieties and one new form are described. Var. *humilis* grows in the northern counties of England, and var. *insignis* is known from Ross (Herefordshire) and Dymock (Gloucestershire).

49. Pugsley, H. W. "Notes on British Euphrasias, III." *Journ. Bot.*, lxxi, 83-90. These notes result mainly from a study of the herbaria of C. E. Salmon, Arthur Bennett, and Col. H. H. Johnston. *E. caerulea* [non Tausch] Bucknall is described as *E. micrantha*, var. *Johnstonii* var. nov. *E. frigida* Pugsley is still left untypified after examination of the Labrador material in Herb. Wettstein. Some Orkney material is described as a new forma *grandiflora* of *E. confusa*. The Devon plants which had been referred to *E. salisburgensis* Funck are determined as *E. confusa* (f. *albida*).

50. Pugsley, H. W. Review of "Taxonomical Remarks on *Juncus alpinus* Villars and some related species," by Dr Lindquist. *Journ. Bot.*, lxxi, 167-168. The Blair Atholl plant is thought to be probably *J. Marshallii* Pugsley, not *J. alpinus* Vill.

51. Rasmussen, A. J. "Några iakttagelser över *Beta maritima* L." *Bot. Not.* (1933), 316-324. This is an account of wild *B. maritima* populations investigated by the author in 1932, mainly in Great Britain.

52. Raunkiær, C. "De danske Crataegus-Arter." *Bot. Tidskr.*, xliii, 232. Four species between *C. oxyacantha* and *C. monogyna* are described: the synopsis of them (translated) is as follows:—

A. The lowest lateral nerves of the middle leaf of long shoots ± incurved, ↄ curved upwards at the leaf apex.
    a. Ovaries glabrous, *C. oxyacantha*.
    b. Ovaries ± hairy, *C. Palmstruchii*.
B. The lower lateral nerves of the middle leaf of long shoots straight, or in some leaves a little inwardly or outwardly curved.
    a. Ovaries glabrous, *C. Schumacheri*.
    b. Ovaries ± hairy, *C. eremitagensis*.
C. The lower lateral nerves of the middle leaf of long shoots curved outwards especially at the base, ↄ curved away from the leaf apex.
    a. Ovaries glabrous, *C. raavadensis*.
    b. Ovaries ± hairy. *C. monogyna*.

Statistics of variation in the number of styles in each form are given (of about 100,000 flowers in all). [These characters should be investigated in this country, and flowers and fruits of the same trees collected: any such pairs of specimens will be welcomed at the Natural History Museum and Kew.]

53. Rendle, A. B. "Pentandrous Form of *Orchis mascula* L." *Journ. Bot.*, lxxi, 352-4 (short note). Description and figure of an abnormal specimen from Suffolk (R. Burn) in which the labellum bore two pollen sacs, in addition to the normal pair and an additional lateral imperfect pair.

54. Rodolico, A. "Appunti Sulla Cariologia E Sull' Embriologia Delle 'Muleae'." *Nuovo Giorn. Bot. Ital.*, xl, 421. The chromosome number of *Pulicaria dysenterica* Bernh. is shown to be n=10.

55. Saint-Yves, A. "Notes critiques sur quelques espèces du Festuca." *Bull. Jard. Bot. Acad. Sc. U.R.S.S.*, xxx, livr. 5-6, 711. Several new subspecies and varieties of British species are described.

56. Salisbury, E. J. "The Influence of Man on Vegetation." *Trans. S.E. Union Sc. Soc.*, 1933, 1. The author first emphasises the importance of man, both past and present, in the distribution of seeds, and comments on the unwillingness of botanists to admit this factor in phytogeographical work. Numerous instances, such as seeds carried in trouser turn-ups, are quoted. He concludes that when human intercourse between Britain and Europe commenced, plant introduction was considerably accelerated. The second half of the paper is devoted to an historical survey of the deforestation of Britain by man and its effect on the vegetation. It is pointed out that by maintaining wooded areas in a coppiced condition many species which would be absent in the primaeval forest are allowed to develop freely through man's activities.

57. Samuelsson, G. "*Carices Muehlenbergianae* Tuckerman i Norden." *Svensk Bot. Tidskr.*, xxvii, 1. An historical account of the treatment of this difficult group of sedges in Scandinavia is given and three species are finally recognised—*C. contigua* Hoppe, *C. Pairaei* F. Schultz, and *C. divulsa* Good.—and its subspecies *Leersii* (F. Schultz) W. Koch. A key, figures and full distributional data are given for these forms in Scandinavia.

58. Sprague, T. A., and Green, M. L. "*Silene Cucubalus*: the correct name of the bladder-campion." *Kew Bull.*, 1933, 151. It is shown that, owing to the rule passed at Cambridge in 1930 rejecting all later homonyms, the correct name for the bladder-campion is *Silene Cucubalus* Wibel.

59. Stirling, J. "Studies of Flowering in Heterostyled and Allied Species: Part I. Primulaceae." *Publication of the Hartley Botanical Laboratories of the University of Liverpool, No. 8* (1932). *Primula vulgaris* and *P. veris* are part of the material in which the rates of growth of flower parts are investigated as well as genetics of heterostyles, and phylogenetic theories are deduced therefrom.

60. Tjebbes, K. "The Wild Beets of the North Sea Region." *Bot. Not.* (1933), 305-315. The author considers the distinction between *B. vulgaris* and *B. maritima* is practically untenable for nearly all the distribution of "*Beta* (*vulgaris* × *maritima*) L., a polymorphic species." "Forms with prostrate stems may be annuals and perennial types with ascending or erect stems are quite as common as perennials with prostrate stems (at least in Southern Europe and Africa). It seems as if all possible combinations of the so-called distinctive characters are somewhere realised. But in the North Sea, on the contrary, *B. maritima* shows little variation, and this extends to Devon and Cornwall, but less so in the Channel Islands and Northern France. Cultivation experiments are described and the origin of the "North Sea ecotype" is discussed. This is re-

garded as possibly due to gene selection by the harder conditions of life [rather than what would appear more probable to us—that this *B. maritima* is one species and the Mediterranean variability and the cultivated beet strains are due to hybridisation.—A.J.W.].

61. TRAUTMANN, R. "*Mentha nemorosa* Willd. und ihr Formenkreis." *Bot. Közlemények*, xxx, fiiz, 1-4, 26. A full description of *M. nemorosa* Willd. (sensu lat.) is given, followed by a key to its varieties.

62. TURRILL, W. B. "A Study of Variation in *Glaucium flavum*." *Kew Bull.*, 1933, 174. From an intensive study of gross morphological characters from herbarium material it is shown that *G. flavum* (sensu lat.) is most polymorphic in E. Mediterranean regions and that, in spreading westwards, certain biotypes become "weeded out," leaving a population with longer and broader fruits, yellow flowers and adaptation to coastal conditions. To this western population the name *G. flavum* sensu stricto should be given. Eastwards from the Balkan Peninsula forms with shorter, more slender, glabrous fruits and darker flowers predominate; these should be called *G. flavum*, var. *leiocarpum* Stoy. et Steff. Various other forms are discussed, some of which are considered distinct species and some merely variations of *G. flavum* sensu lat. A scheme for comparing plants showing different characters within a polymorphic species is applied to the present plant.

63. WANSCHER, J. H. "Studies on the Chromosome Numbers of the Umbelliferae, III." *Bot. Tidskr.*, xliii, 384-399. British species mentioned are:—(*Bifora radians* 2n = 22); *Bupleurum tenuissimum* 2n = 16; *Trinia vulgaris* (?) DC. 2n = 18; *Pimpinella Saxifraga* subsp. *eu-Saxifraga* Thell. n = 18 (in subsp. *nigra* (Willd.) n = 9); *Daucus Carota* L. (four varieties) n = 9, 2n = 18. Numbers for *Hedera Helix* L. are:—*typica* 2n = 44-48, *hibernica* 2n = 88-98.

64. WATSON, WM. "Notes on Rubi. I. What is *Rubus rhombifolius* Weihe?" *Journ. Bot.*, lxxi, 223-228. The plant so named by British botanists, following Focke, is described as *R. rhodanthus*, sp. nov., "the true *R. rhombifolius* remained unrecognised until very recently" (*Rep. B.E.C.*, 1931, p. 643 infra). II. "*Rubus Colemanni* Bloxam." *Ibid.*, 228-229. Bloxam's original Packington plant is different from some other plants which have been so named and which are described as *R. crudelis*, sp. nov.

65. WATSON, W. "*Rubus opacus*, subsp. *nobilissimus* nov." *Journ. Bot.*, lxxi, 130-134. A new plant from Surrey (Abrook Common).

66. WATSON, W. "*Rubus latifolius* Bab. and *R. laetus* Wm. Watson." *Journ. Bot.*, lxxi, 127-130. A reply to criticism by Messrs Barton and Riddelsdell, discussing the characters of the former in Perthshire and the nomenclature of the latter.

67. **Wilmott, A. J.** "*Cirsium heterophyllum* × *palustre* in Inverness." *Journ. Bot.*, lxxi, 17 (short note).

68. **Wilmott, A. J.** "An Addition to the Breckland Flora: *Veronica praecox* All." *Journ. Bot.*, lxxi, 159-160. An account of this species, discovered by J. E. Lousley near Barton Mills.

69. **Wolley-Dod, A. H.** "The Markwick Manuscripts." *Journ. Bot.*, lxxi, 348-351. Markwick lived at Catsfield Place, Sussex, and wrote a number of botanical books and diaries now in the Hastings Museum. They include Phenological calendars from 1768 to 1776 (Catsfield) which contain a large number of first records of plants for the county, and descriptions of plants accompanied by drawings. At the Linnean Society there is a foolscap MS. *Plantae Sussexienses*, or a Catalogue of Plants growing wild in the County of Sussex (descriptions and notes of over 550 species) and a folio MS. of 37 illustrations of Grasses and Sedges with full descriptions.

OBITUARIES.

Dr Eric Drabble. It is with the deepest regret that we have to record the passing of Dr Eric Drabble at Freshwater, the Isle of Wight, on August 3rd, 1933. He has rendered conspicuous service to the members of this Society for over 20 years, and his willing and self-sacrificing efforts on our behalf have been of the highest value. As a botanist he possessed the true scientific spirit, approaching each problem with an open mind free from preconceptions, painstaking to a high degree in ascertaining the facts of the case and impartially weighing the evidence they afforded. As a result of this his determinations were always of the highest value. His decease is a heavy blow to British systematic botany, and his services will be greatly missed. To the writer it is a keen personal loss, only tempered by the most pleasant recollections of his unfailing friendship and kindliness of spirit.

The following authentic account of his career appeared in the " Derbyshire Times " of August 12th, and will be read with much interest by his numerous friends.

Dr Eric Drabble was born in 1877 at Herne House, near Chesterfield. He came of an old Derbyshire family, and was the son of Mr John Drabble, J.P. Being a delicate boy, he was educated privately and at Chesterfield Grammar School, where he became head boy, and in 1899 proceeded to University College, Sheffield, where he worked in the Science Department and later in the Medical Department. Becoming keenly attached to the study of biology, he proceeded to the Royal College of Science, South Kensington, and there obtained the London B.Sc. degree, 1st Class Honours in Botany, the Associateship of the College (1st Class), and later the Honours Associateship.

In 1901, on the death of A. W. Bennett, he was appointed Lecturer in Botany at St Thomas' Hospital Medical School, and in 1903, Lecturer and Senior Demonstrator at the Royal College of Science, under Professor (now Sir John) Farmer. He was awarded the London D.Sc. degree in 1903. In 1905 he was appointed Lecturer in Economic Botany at the University of Liverpool, but the commercial atmosphere was very distasteful to him, and in 1908 he returned to London as head of the Botanical Department at the Northern Polytechnic. Here the charge of the University work was most congenial to him, and he retained the post until 1924, when he retired for reasons of health, but remained hon. head of the Botanical Department at the Polytechnic, in which he took a keen interest. In 1908 he was awarded the D.Sc. degree of the University of Sheffield.

During the war he was repeatedly rejected for active service, on account of asthma and heart trouble, so he took over the botanical classes at the Birkbeck College, and combined this work with that of the Northern Polytechnic. Ill-health caused his retirement to the Isle of Wight in 1924, and though he suffered less in subsequent years, events proved that he must have had chronic euremia all his life. This disease, though the cause of his asthma, did not reveal itself until the long illness of the past five months, and caused his death on August 3rd, 1933.

He was keenly interested in British plants, and was the chief authority on the British pansies, which he monographed and listed for England, Scotland and Ireland. He continually published papers on various genera, especially those which needed re-investigation owing to errors in identification and nomenclature having been made by previous authors, and then repeated in subsequent notes. He also contributed papers to various scientific journals, including those of the Linnean Society, the Royal Society of London, the Botanical Society, and to the *Journal of Botany.*

After his retirement, a large part of his time was occupied in identifying British plants for collectors all over the country, and he was appointed one of the three referees for the Watson Botanical Society of the British Isles. He also published various supplementary lists to the Flora of Derbyshire and the Isle of Wight. His herbarium contains authentic examples of almost every British plant, and it will finally find a home in the Natural History Museum, South Kensington. Both before and after his retirement, Dr Drabble was continually in demand as an examiner in botany and biology for the University of London, the Northern Universities and for Oxford, and he welcomed these appointments as giving him an opportunity of keeping in touch with his wide circle of scientific friends.

His interests were very varied, including, besides those associated with biology, a keen appreciation and love of English literature, especially that of the 18th century. His considerable knowledge of church history and his devotion to the presence of Christ in the Holy Eucharist, led him to be an enthusiastic Anglo-Catholic, though his natural reserve made him reticent on the personal side of this subject.

An early enthusiasm for the Gilbert and Sullivan operas was shown by his frequent attendance at the performances of these plays in London and later by his association with the well-known Northern Polytechnic Operatic Society from its start until his death. He was for some time the hon. business manager to the Society and a welcome and popular non-acting member. His sense of humour, quick wit and generous spirit made him friends with all classes and all ages. He hated cant and self-assertion, but had a great admiration for the natural courtesy and good sense of country folk, with whom he loved to chat, especially when in his own beloved native county of Derbyshire.

He was buried at Freshwater on August 5th, and a requiem was said for him by Archdeacon Clayton in Chesterfield Parish Church, for which he had such pride and love.

He married in 1906 Hilda Lake, second daughter of Thomas Henry Lake, J.P., of Moresk, Truro, Cornwall, who survives him.

William Duppa Miller, who died November 7, 1933, was born on July 5, 1868, at "The Poplars," Tupsley, Hereford, the eldest of several brothers and sisters. The family later moved to Oxford, and, curiously enough, bought No. 3 Crick Road, only a few doors from the house where Dr Druce spent the latter part of his life. In those days Druce had not yet moved from his business premises in the town; but it was inevitable that the Miller children, keen nature lovers as they were, should come to know him and take him the plants to name which they found on their long country rambles. In this way was laid a friendship frequently afterwards renewed throughout life.

Miller was educated at St Edward's School, Oxford, and subsequently gained an Exhibition at Hertford College. While there he coxed his college boat so successfully that under his care it rose from the bottom of the river into the first division—a record for which, alas, he paid all his life, for his efforts to reduce his weight at the time greatly impaired his health. After leaving the University he started his career as an engineer in an uncle's shipbuilding yard at Bristol, until a horrible accident there temporarily broke his nerve and set him on new lines. For a while he took up scholastic work, later becoming Private Secretary to Lord Sandon, afterwards Lord Harrowby, at Sandon Park, Staffs. Subsequently for nearly twenty years he held a similar post to the late Hon. E. W. F. Portman (and afterwards to his widow), acting as Agent for the Hestercombe estate. Whenever possible, he travelled widely, both at home and on the Continent, always welcome and popular wherever he went, not only for his genial presence but also for his keen love of sport—shooting, deer-stalking, fishing, golf, tobogganing, skating and the like, in all of which he delighted and in several of which he excelled.

Always keen on natural history and an out-door life, Miller's botanical bent was finally settled by an accidental meeting, in Devonshire, with that magnificent botanist, the late Rev. E. S. Marshall, and his family. For years in succession he and Marshall went botanical holidays together—to the Highlands, Teesdale, Cornwall and the like, and on these trips he also met Mr F. J. Hanbury and other well-known systematists. Thus his botanical tastes were fostered and encouraged until, as an older man and with fewer ties, he was enabled to give himself heart and soul to the pursuit he best loved.

For the last years of his life field botany practically absorbed all his time and energies, and in its cause he roamed anew through all the flower haunts of England, Scotland and Ireland. He was especially keen on the flora of his own adopted county of Somerset, and personally tracked down almost every one of its recorded plants. His local knowledge was unrivalled, as witness two articles from his pen, "The Southern Distribution of *Listera cordata*" and "Extinct and Rare Species of the County of Somerset" in the last Report. He was Hon. Secretary to the Botanical Section of the Somerset Archaeological and Natural History Society for twenty years or more, and an active member of the South Western Naturalists' Union; while to the Wild Flower

Society he gave his unfailing help and support. Indeed, he was never happier than when he was aiding other field botanists (provided always they were not "exterminators," for on this point he was careful and conscientious to a fault). To lead his botanical friends to the happy hunting grounds of Shapwick Moss, Brean Down, Cheddar Gorge, the Mendips, or Steep Holme to pay their respects to the Peony, was a real delight to him, and an unforgettable pleasure and inspiration to those who accompanied him.

Only those privileged to share the hospitality of Miller and his devoted sister in their pleasant home at Burnham-on-Sea, can have any real idea of the vast amount of unselfish labour that every spring and summer brought to both. One would think that every British field botanist and every lover of wild flowers must have sought Miller's assistance at one time or another either personally or by letter. And to all alike, even to the veriest tyro, he gave of his best with a patience and care that were inexhaustible. The demands upon his strength and leisure, in fact, became overwhelming, and after a severe operation, two years ago, proved too heavy for his failing vitality, so that in very truth he may have been said to have given his life for his botany and for his friends. Perhaps this was as he would have wished it, since in no man was the instinct "to help" more keenly developed, even as no man drew keener pleasure from the fascinating pursuit that he made his own. G. F.

Dr O. Stapf, F.R.S. 1857-1933. Dr Otto Stapf, F.R.S., was born at Ischl in Upper Austria on 23rd March 1857. Much of his boyhood was spent at Hallstatt, where his father was in charge of the salt-springs. He studied under Professor Wiesner in Vienna, and took his Ph.D. degree with a thesis on crystal and crystalloid structure in plants. The manuscript of this thesis is now preserved in the library at Kew, but has apparently never been published. In 1882 he became Assistant to Professor Kerner von Marilaun and was made a Privatdozent in the University in 1887. In 1885 he travelled in Persia, making valuable collections which are now at Kew. Unfortunately, the full results of his travels were never published. During the years 1885-1889 he published several valuable papers on the flora of the Nearer East and a classic revision of the genus *Ephedra*. His interest in the flora and vegetation of the Orient lasted all his life.

In January 1891 Stapf commenced work at Kew as Assistant for India, and from that date till his death he made Kew his home. In 1899 he was appointed Principal Assistant and from 1909 to 1922 was Keeper of the Herbarium and Library. After his retirement he edited the Botanical Magazine for the Royal Horticultural Society (9 volumes) and acted as Honorary Editor of the Index Londinensis (6 volumes). He served as Botanical Secretary to the Linnean Society from 1908 to 1916.

Stapf's published work, prepared while a member of the Kew staff, included accounts of the *Sonerileae*, the flora of Kinabalu in North

Borneo, the Gramineae (part) of India, South Africa and Tropical Africa, African *Apocynaceae*, *Orobanchaceae*, *Lentibulariaceae*, *Pedalineae*, *Myristicaceae*, *Lauraceae*, *Proteaceae*, plants of Liberia and Uganda, the Aconites of India, and Statices of the Canaries. A select list of his works in chronological sequence is published in the Kew Bulletin, 1933, 374.

The economically most important family of the *Gramineae* occupied much of Stapf's official time. Not only did he prepare certain genera for Hooker's Flora of British India, the whole of the account of the family for the Flora Capensis, and most of the genera so far published in the Flora of Tropical Africa, but he investigated, with or without subsequent publication, grass collections from all parts of the world. The much abbreviated list of his researches given in the last paragraph shows, however, that he was no narrow specialist. Many of his later papers moreover indicate how keenly he kept in touch with research in other branches of botany than taxonomy, and he was always willing to discuss, in a constructively critical spirit, all recent work in genetics, ecology, and other wider aspects of biology.

It is somewhat difficult for one who worked intimately with Stapf for nearly 25 years to appraise him as a botanist and as a man without seeming biased. His abilities are unquestionable. None could concentrate, with apparent disregard of time and space, like he could. Every point bearing, however remotely, on the problem on hand was investigated as fully as possible with meticulous care. Perhaps this is nowhere more clearly shown than in his work for the Botanical Magazine, which periodical he raised to a point of excellence it had never before attained. His wide knowledge of languages, his considerable artistic powers, and the respect felt for him by foreign colleagues were all used in his botanical studies. His correspondence was vast and his help was never sought in vain.

Stapf had a fine figure and a good presence. Though quiet and unassuming, he invariably refused to accept or reach conclusions on any subject without either making his own investigations or giving much thought to data supplied to him. Superficially he sometimes appeared rather autocratic and he certainly felt at times the irksome and frequently unnecessary restraint imposed on some of his botanical activities. He was actually endowed with almost superhuman patience, constantly devoted hours of labour for the benefit of his friends, was at heart kindness itself, and looked on the broad aspects of the world's affairs with a humane sanity which withstood even the terrible years of war. For Stapf the war was a difficult and trying period, from his personal and from his official standpoint. Though always loyal to the country of his adoption, and a severe critic of the Central Powers, his wide knowledge prevented him from condemning all individuals of any nation but could not prevent the heart-strain of one with friends on both sides.

It is fitting that special mention should be made here of Stapf's more important contributions to British Botany. Firstly there were his studies of single species. Of these that on *Spartina Townsendii* was most prolonged, involving, as it did, much field work. Stapf upheld the theory of hybrid origin of this species in papers published in *Gard. Chron.*, ser. 3, xliii, 33 (1908) and *Journ. Bot.*, xlvi, 76 (1908); in spite of the difficulty, at that time, of explaining how a plant of hybrid origin with two distinct species for its parents could breed true. A more recent account is given by Stapf in *Bot. Mag.*, tab. 9125 (1927). Stapf's hypothesis has since been most strongly supported by cytological examination of *Spartina Townsendii* and its putative parents, *S. stricta* and *S. alterniflora*. Huskins (in *Nature*, cxxvii, 781 (1931) and *Genetica*, xii, 531 (1930)) has shown that the somatic chromosome number of *S. Townsendii* is 126, that of *S. stricta* 56, and that of *S. alterniflora* 70. It therefore seems very probable that *S. Townsendii* arose by two steps. Firstly, *S. stricta* (with $n = 28$) crossed with *S. alterniflora* (with $n = 35$) and gave a sterile hybrid with $28 + 35 = 63$ somatic chromosomes. This chromosome number was doubled in a vegetative part of the hybrid, with the formation of a flowering shoot with $2n = 126$. This shoot being fertile established the true breeding *S. Townsendii* which, on account of its hybrid-vigour, quickly spread over suitable terrain even at the expense of its parents. In technical expression *S. Townsendii* is an allopolyploid.

In the Botanical Magazine tab. 9088 (1926) Stapf described, as a new species, *Aconitum anglicum* (*A. Napellus* auct. plur. non L.). This is the wild British monkshood which is also the one most commonly cultivated in country cottage gardens. The original account should be consulted by every British botanist as an example of painstaking taxonomic research and as illustrating the need of comparing our British plants most carefully with continental species.

Stapf described several plants discovered as aliens in the British Isles or Europe as new species, *e.g.*, *Millotia depauperata* Stapf (*Compositae*), *Koeleria advena* Stapf (*Gramineae*), and *Thellungia advena* Stapf (*Gramineae*).

His researches on the Southern Element in the British Flora published in Engler's Bot. Jahrb., 509 (1914) and Proc. Linn. Soc., 129th Session, 81 (1917), are of the utmost importance to students of plant-life in this country. Stapf showed that "the Atlantic and Mediterranean elements in the British flora amount to about 9 per cent. of the phanerogams and vascular cryptogams. Of these little more than two-fifths are referable to the Atlantic and almost three-fifths to the Mediterranean elements." His analysis of the ecological differentiation of the southern element is most important, as is also the very clear conclusion that examples of discontinuity of distribution must be considered in connection with the facts of distribution for the whole flora and not isolated as inexplicable miracles. It is probable that more recent research in the geological, palaeometeorological, and palaeobotanical branches of science, especially studies on the history of the Quaternary Ice Age and on the pollen content of peat beds, will modify some of Stapf's conclusions, as indeed he would seem to have thought not unlikely (see espec. p. 83 of Proc. Linn. Soc., 129th Session), but the facts brought forward by him will always have to be taken into account in framing any history of our flora and vegetation.

In conclusion, the writer would like to place on record his deep sense of gratitude to one who was always a dear and valued friend and teacher. The sense of personal loss has increased with the fuller realisation that no more can help, inspiration, or community of interest be sought from a respected and beloved chief.

W. B. Turrill.

Miss A. A. M. Tulk, who died on Easter Sunday, 1934, was a very keen seeker of wild flowers, especially about her Surrey home. Some eighteen years ago she, with Miss Bacon, re-established *Carex tomentosa* on Chertsey Meads, which had been first recorded in the neighbourhood some years before, but seemed to have been lost sight of. Clever, popular and most unselfish, she had a host of friends, especially among the field botanists whom she was ever ready to help, and many will have happy memories of pleasant and profitable hours spent under her skilful guidance.

NEW COUNTY AND OTHER RECORDS.

†3/4. Anemone apennina L. Near Mitcham, Surrey, well established in two places, H. S. Redgrove.

4/1. Adonis annua L. Harewood, near Andover, N. Hants, v.-c. 12, W. Simpson.

5/1. Myosurus minimus L. Castle Farm, Southwick, S. Hants, v.-c. 11, P. M. Hall.

6/6. Ranunculus Lingua L. Fleet Pond, N. Hants, v.-c. 12—only the second recorded habitat in this vice-county, Lt.-Col. G. Watts.

*6/21b. R. circinatus Sibth., var. subaquaneus (Wahl.) Pears. Cauldshiels Loch, near Galashiels, v.-c. 79. A form with leaves rather nearer to those of *R. trichophyllus* in shape but in size and disposition more nearly akin to those of *R. circinatus*. The peduncles are those of the latter species and mainly terminal, N. Douglas Simpson.

*6/22(2). R. radians Rev., var. Godronii (Gren.). Pond, Mundham, W. Sussex, v.-c. 13. A new vice-county record for this variety, Miss E. S. Todd.

*6/24. R. heterophyllus Weber. Coldingham Loch, Berwickshire, v.-c. 81, G. Taylor.

6/24c. R. heterophyllus Weber, var. submersus Bab. Pond, Thirsk, v.-c. 62, T. J. Foggitt, teste Pearsall.

6/25. R. peltatus Schrank. With glabrous carpels, Harperrig Reservoir, Edinburgh, G. Taylor.

6/26. R. pseudo-fluitans Baker & Foggitt. Cheddar, N. Somerset, H. S. Redgrove; Kemble, W. Glos., v.-c. 34, April 18, 1933, Lady Davy.

6/27. R. sphaerospermus Boiss. Hunton, near Stoke Charity, Hants, Lady Davy.

6/30. R. lutarius Bouvet. Slapton, Devon, Miss E. S. Todd.

6/33. R. Ficaria L. Damp ditch, Oaksey, N. Wilts, v.-c. 7, April 19, 1933, J. D. Grose.

†10/1. Eranthis hyemalis Salisb. Near Mitcham, Surrey, well established and abundant, H. S. Redgrove.

†12/1. Nigella damascena L. Waste heap, Letchworth, Herts, v.-c. 20, H. Phillips.

*†24/1. Roemeria hybrida DC. Waste ground near railway sidings, Nottingham, v.-c. 56, R. Bulley.

†30/3. Capnorchis eximia (DC.) Dr. One patch naturalised in a wood at Menabilly, E. Cornwall, v.-c. 2, J. D. Grose, teste Fraser.

31/1. Corydalis claviculata DC. Near Tavistock, v.-c. 3, Dr H. B. Willoughby Smith; *Glenquiech, Angus, R. and M. Corstorphine.

32/10b. Fumaria officinalis L., var. elegans Pugsl. Park Farm, Hambledon, S. Hants, v.-c. 11—to be confirmed by Pugsley, P. M. Hall.

†36/5. Barbarea intermedia Bor. Near West Meon Station, S. Hants, v.-c. 11, Lt.-Col. G. Watts.

37/3. Arabis scabra All. Somerset side of River Avon, abundant in one place; Durdham Down, Bristol, Glos., rather scarce, H. S. Redgrove.

37/6. A. glabra Bern. Between Twyford and Loddon Bridge, Berks, H. S. Redgrove.

*39/3. Cardamine impatiens L. Fothringham, Angus, an extension of its northern range in Scotland, R. and M. Corstorphine.

†39/6. C. trifolia L. Found in two places a mile apart, near Casterton, Westmorland, J. B. Foggitt.

39/7. C. bulbifera Crantz. Etchingham, E. Sussex, v.-c. 14, Miss Stanley.

†42/9. Alyssum incanum L. Between Truro and Malpas, Cornwall, v.-c. 1, Miss E. S. Todd.

43/4. Draba muralis L. Between Cheddar and Charterhouse, Somerset, H. S. Redgrove.

44/1e. Erophila verna E. Meyer, var. majuscula (Jord.). Canal bank, Fleet, N. Hants, v.-c. 12, Lt.-Col. G. Watts, teste Drabble.

*49/5. Sisymbrium Irio L. Waste ground at Dover, John Jacob.

†49/12. S. erysimoides Desf., versus var. xerophilum Fourn. Avonmouth Docks, W. Glos., 1933, Sandwith.

*†54/2. Brassica Napus L., sensu lato (*fide* A. R. Horwood, who saw my specimen at the Royal Herbarium, Kew, on 21st November

1933).—Ref. No. 4883, grassy, gravelly, waste ground near a wooden poultry-house, 160 feet above mean sea-level, Hamar House, Stromness, Mainland, Orkney, 22nd September 1933, HENRY HALCRO JOHNSTON. Not native. Introduced with poultry food into Orkney. One plant, in flower without fruit developed; only seen by me. Petals yellow. A new record for this alien species for v.-c. 111, discovered by James Sinclair, junior, in my company, on 22nd September 1933.

†54/16. B. JUNCEA Coss. Waste ground, Stoke-on-Trent, new to N. Staffs, E. S. EDEES.

*†54/20. ERUCASTRUM POLLICHII Sch. & Spenn. A few plants on waste ground at Dover, v.-c. 15, JOHN JACOB.

54/22. B. INCANA L. (B. ADPRESSA Boiss.). Adventive at Par, E. Cornwall, v.-c. 2, Miss E. S. TODD.

†61/3. LEPIDIUM DRABA L. Broadstairs, I. of Thanet, E. Kent, v.-c. 15, Dr J. C. M. GIVEN.

67/1. HUTCHINSIA PETRAEA Br. Somerset side of the River Avon, *very* sparingly; Durdham Down, Bristol, Glos., very sparingly and burnt up, H. S. REDGROVE.

†70/1. VOGELIA (NESLIA) PANICULATA (L.) Hornem. Dunbridge Station, S. Hants, v.-c. 11, Lt.-Col. W. A. PAYN; Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†74/2. BUNIAS ORIENTALIS L. Waste ground between Truro and Malpas, E. Cornwall, Miss E. S. TODD.

80/1b. RAPHANUS RAPHANISTRUM L., var. FLAVUS Schub. & Mart. Lower Yard Farm, Godshill, I. of Wight, v.-c. 10, P. M. HALL.

87/3. HELIANTHEMUM POLIFOLIUM Mill. Bleadon, N. Somerset, H. S. REDGROVE.

1932 and 1933 VIOLA Records seen by P. M. Hall.

88/1. VIOLA STAGNINA Kit. Woodwalton Fen, Hunts, v.-c. 31, J. E. LOUSLEY.

88/3. V. SILVESTRIS Lam. Type and f. *pallida* from Berkeley, W. Gloster, v.-c. 34, E. NELMES; as a garden plant, Colwall, Hereford, v.-c. 36, F. M. DAY; Lane, S.W. of Capel, Surrey, J. E. LOUSLEY.

88/3. V. SILVESTRIS Lamarck, f. PALLIDA Newman. Garden weed at Brockwood, The Downs School, Colwall, Herefordshire, F. M. DAY.

88/3b. V. SILVESTRIS Lam., var. PUNCTATA Dr. East Tytherley, S. Hants, v.-c. 11, P. M. HALL; Colwall, Hereford, v.-c. 36, F. M. DAY; near Brixham, S. Devon, v.-c. 3, F. M. DAY.

88/4. V. RIVINIANA Reichb. Near Brixham, S. Devon, v.-c. 3., F. M. DAY; Berkeley, W. Gloster, v.-c. 34, E. NELMES; Lane, S.W. of Capel, Surrey; Chailey, East Sussex; near Dagnall, Beds, J. E. LOUSLEY.

88/4. V. RIVINIANA L. × SILVESTRIS. Scabbacombe and near Brixham, S. Devon, v.-c. 3, F. M. DAY.

88/4b. V. RIVINIANA Rchb., var. DIVERSA Greg. Roborough Down, Plymouth, S. Devon, v.-c. 3, E. MASSON PHILLIPS; Scabbacombe, S. Devon, v.-c. 3, F. M. DAY; near Barnstaple, N. Devon, v.-c. 4, R. TAYLOR; Blagdon Hill, S. Hants, v.-c. 11, P. M. HALL; Epsom Common and Mitcham Common, Surrey; Copthorne Common, E. Sussex, J. E. LOUSLEY.

88/4c. V. RIVINIANA Rchb., f. MINOR Murb. Scabbacombe, S. Devon, v.-c. 3, F. M. DAY.

88/4e. V. RIVINIANA Rchb., f. NEMOROSA N.W. & M. Scabbacombe, S. Devon, v.-c. 3, F. M. DAY; cliffs, W. side of Plymouth Sound, E. Cornwall, v.-c. 2, E. MASSON PHILLIPS; Berkeley, W. Gloster, v.-c. 34, E. NELMES; Colwall, Hereford, v.-c. 36, F. M. DAY; by disused canal, Tickner's Heath, Surrey, J. E. LOUSLEY.

88/6. V. CANINA L. × LACTEA Sm. Chailey Common, E. Sussex, J. E. LOUSLEY.

88/6b. V. CANINA L., var. ERICETORUM Reichb. Near Barnstaple, N. Devon, v.-c. 4, R. TAYLOR; on chalk, Itchen Stoke Down, N. Hants, v.-c. 12, P. M. HALL; Richmond Park, Surrey, v.-c. 17, C. E. HUBBARD; Mitcham Common, Surrey, J. E. LOUSLEY.

88/6b. V. CANINA L., var. ERICETORUM Reichb. × RIVINIANA Reichb. var. DIVERSA Greg. Pentridge Hill, Dorset, v.-c. 9, P. M. HALL.

88/6d. V. CANINA L., var. PUSILLA Bab. Braunton Burrows, N. Devon, v.-c. 4, Dr F. R. E. WRIGHT; Scolt Island, Norfolk, ex KEW; coast of Glamorgan, v.-c. 41, Miss E. VACHELL. N.B.—The Braunton plant, and perhaps the others, may be var. *sabulosa* Reichb. At the moment I am not satisfied that these two varieties can be separated.

88/6g. V. CANINA L., var. CRASSIFOLIA (Grönv.) Dr. Woodwalton Fen, Hunts, J. E. LOUSLEY.
×STAGNINA. Woodwalton Fen, Hunts, J. E. LOUSLEY.
×RIVINIANA. Ramshorn Down, Bickington, S. Devon, v.-c. 3, Miss C. E. LARTER; Glamorganshire coast, v.-c. 41, Miss E. VACHELL; Chailey Common, E. Sussex, J. E. LOUSLEY.

88/7. V. LACTEA Sm. Hayton, S. Devon, v.-c. 3, Miss TEAGE; Heathfield, E. Sussex, v.-c. 14. Col. A. H. WOLLEY-DOD; Chailey Common, E. Sussex, J. E. LOUSLEY.

×RIVINIANA. Heathfield, E. Sussex, v.-c. 14, Col. A. H. WOLLEY-DOD, also from chalk near Eastbourne, its presence in this situation apparently to be explained by the occurrence of pockets of acid soil overlying the chalk; also Chailey Common, E. Sussex, J. E. LOUSLEY.

88/7. V. LACTEA Sm. Copthorne, E. Sussex, v.-c. 14, H. S. REDGROVE.

88/8. V. ODORATA L. Copse below Kits Coty House, Aylesford, E. Kent, an unusual caespitose form with pubescent peduncles, but not a hybrid with *hirta*, J. E. LOUSLEY.

88/8. V. ODORATA L., f. IMBERBIS (Leight.). Bevington, near Berkeley, W. Gloster, v.-c. 34, E. NELMES.

88/8d. V. ODORATA L., var. DUMETORUM (Jord.). Scabbacombe, S. Devon, v.-c. 3, F. M. DAY; f. IMBERBIS (Leight.). Bevington, near Berkeley, W. Gloster, v.-c. 34, E. NELMES; Longdon, Worcester, v.-c. 37, F. M. DAY.

88/8h. V. ODORATA L., var. SUBCARNEA (Jord.). Bessilsleigh, Berks, v.-c. 22, Miss E. S. TODD; an allied form, not typical of this variety and possibly var. *lilacina* Beck. Longdon, Worcester, v.-c. 37, F. M. Day. The same form as the last but f. *imberbis* (Leight.). Bevington, Berkeley, W. Gloster, v.-c. 34, E. NELMES.

88/9. V. HIRTA L. Near Hill, W. Gloster, v.-c. 34, E. NELMES; Woodwalton Fen, Hunts, J. E. LOUSLEY.

88/9. V. HIRTA L. × ODORATA. Near Brixton, E. MASSON PHILLIPS, and near Brixham, F. M. DAY. Both S. Devon, v.-c. 3. Aldbourne, N. Wilts, v.-c. 7, Miss E. S. TODD; Mickleham, Surrey, v.-c. 17, J. E. LOUSLEY; Inkpen Hill, Berks, approaching × *sepincola* Jord., J. E. LOUSLEY.

88/9b. V. HIRTA L., var. FOUDRASI Jord. Berry Head, Brixham, S. Devon, F. M. DAY.

88/9b. V. HIRTA L., var. FOUDRASII (Jord.) R. & F. Berry Head, S. Devon, v.-c. 3, F. M. DAY; Aldbourne, N. Wilts, v.-c. 7, Miss E. S. TODD; Box Hill, Surrey, v.-c. 17, J. E. LOUSLEY.

88/9d. V. HIRTA L., var. INCONCINNA J. Briq. Berry Head, S. Devon, v.-c. 3, F. M. DAY.

88/9j. V. HIRTA L., var. PROPERA (Jord.) Gillot. Scabbacombe, S. Devon, v.-c. 3, F. M. DAY; Box Hill, Surrey, v.-c. 17, J. E. LOUSLEY.

88/10. V. CALCAREA Greg. A few plants agreeing with the description of this species, Fleam Dyke, Cambs, J. E. LOUSLEY; Boxhill, Surrey, plentiful, H. S. REDGROVE.

88/11. V. PALUSTRIS L. Dartmoor, F. M. DAY, and Goodameavy, E. MASSON PHILLIPS. Both S. Devon, v.-c. 3. Landford Common, S. Wilts, v.-c. 8, P. M. HALL; St Leonard's Forest, near Colgate, W. Sussex, J. E. LOUSLEY.

88/14. V. CONTEMPTA Jord. Near Silchester, N. Hants, v.-c. 12, Miss E. S. TODD.

88/15. V. VARIATA Jord. Near Sundridge, W. Kent, v.-c. 16, P. M. HALL and W. H. PEARSALL.

*88/27. V. ANGLICA Drabble. Waste ground, Broome, N. Wilts, v.-c. 7, J. D. GROSE.

88/28. V. DESEGLISEI Jord. St Martin's, Scilly Isles, W. Cornwall, v.-c. 1, Miss E. S. TODD.

88/31. V. LEPIDA Jord. Near Sundridge, W. Kent, v.-c. 16, P. M. HALL and W. H. PEARSALL.

*89/4. POLYGALA DUBIA Bellynck, var. DUNENSE (Dum.). Braunton Burrows, N. Devon, v.-c. 3, Dr F. R. ELLISTON WRIGHT. [First record for this variety in N. Devon—flowers pink; upper leaves ± adpressed, narrowly lanceolate or sub-linear; mature capsules oval-cuneiform, distinctly shorter than the wings and broader.—ED.]

89/5. P. CALCAREUM F. Schultz. Itchen Stoke Down, N. Hants, v.-c. 12, P. M. HALL.

92/1. DIANTHUS CAESIUS Sm. Cheddar, N. Somerset, very abundant and plenty of it in accessible places, H. S. REDGROVE.

†96/11. SILENE ITALICA L. Still at Greenhithe, Kent, abundant. H. S. REDGROVE.

100/7. CERASTIUM PUMILUM Curt. Bleadon, N. Somerset, H. S. REDGROVE.

102/8. ARENARIA TENUIFOLIA L. Old Basing, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

103/5. SAGINA SCOTICA Druce. Ben More, Am Binnein, Creag na Caillich, Cam Chreag, Mid-Perth, v.-c. 88, Glen Callater, S. Aberdeen, v.-c. 92, R. MACKECHNIE and E. C. WALLACE.

*103/9. S. REUTERI Boiss. On granitic soil, Lundy Island, N. Devon, v.-c. 4, July 1933, Dr F. R. ELLISTON WRIGHT. This is an interesting addition to the stations in the British Channel area. The plants were excellent examples of the species as described in *Rep. B.E.C.*, 1927, 460-2, and the first I have seen from soil on granite. The *Comital Flora* should be amended to read 4, 6, 10, 37, 41, 45. All other records should be deleted, W.H.P.

105/4. SPERGULARIA CAMPESTRIS (Kindb.) Willk. & Lge. (*S. atheniensis* Aschers. & Schweinf.). Par, E. Cornwall, v.-c. 2, Miss E. S. TODD.

*†107/1. PORTULACA OLERACEA L. Weed in kitchen garden, Blackmoor, Liss, Hants, Hon. W. J. L. PALMER. Plant prostrate, very smooth. Leaves fleshy, sessile or shortly stalked, opposite or upper alternate, obovate or wedge-shaped. Flowers sessile (opening only on sunny mornings); petals 4-6, obovai, yellow. Sepals 2, keeled to the summit. Many stamens. Style deeply 5-6 parted. Flower-bud flat and acute. European, also naturalised in N. America.

†108/1. CLAYTONIA SIBIRICA L. (*C. alsinoides* Sims). Blackmoor, N. Hants, v.-c. 12. Although the *Comital Flora* gives 12, it does not appear either in Townsend's *Flora* or in Rayner's *Supplement*, Hon. W. J. L. PALMER and P. M. HALL; *Whitehall Plain, Epping Forest. near Chingford, v.-c. 18, 1933, B. T. WARD. In the *Comital Flora* no record for this species is given for v.-c. 17, but Salmon (*Fl. Surrey*. 1931, 193) gives two localities for it in that county. Mr Ward reports that the plant is still flourishing exceedingly in the Felday locality.

108/2. C. PERFOLIATA Donn. Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

112/7. HYPERICUM MONTANUM L. Forge Valley, near Scarborough, v.-c. 62, J. CHAPPLE.

112/12. H. DUBIUM Leers. Lamlach, Arran, v.-c. 100, R. MACKECHNIE. Recorded in *Top. Bot.*, Supp. 2, but not in *Comital Flora*.

†117/4. MALVA PUSILLA Sm. By canal between Fleet and Aldershot, v.-c. 12, Lt.-Col. G. WATTS, teste DRABBLE.

*†117/4. M. BOREALIS Wallm., forma (MALVA PUSILLA Smith) (*fide* A. R. Horwood, who saw four specimens of my Ref. No. 4869 at the Royal Herbarium, Kew, on 21st November 1933. Grassy, gravelly, waste ground near a wooden poultry-house, 160 feet above mean sea-level, (1) Ref. No. 4869 (plant in flower and sparingly in young unripe fruit). 6th September 1933, and (2) Ref. No. 4910 (plant in flower and unripe fruit). 30th October 1933, H. H. JOHNSTON. Not native. James Sinclair's specimen of his Ref. No. 968 was collected by him, in my

company, from the same plant, on 22nd September 1933. A new record for this alien species for v.-c. 111.

†117/7. M. NICAEENSIS All. Tip, Bristol, v.-c. 34, 1933, SANDWITH.

†117/9. M. PARVIFLORA L. Phillack, Cornwall, Miss E. S. TODD.

127/7. GERANIUM PYRENIACUM Burm. f. Ashley, S. Hants, v.-c. 11, Rt. Hon. H. T. BAKER and P. M. HALL.

127/10. G. MOLLE L., var. AEQUALE Bab. Avonmouth Docks, W. Glos., 1933, SANDWITH.

†133/4. IMPATIENS GLANDULIFERA Royle. Penylan, near Ruabon, Denbigh, v.-c. 50, Miss V. G. OWLES; *Lamlach, Arran, v.-c. 100, R. MACKECHNIE; *near Coldstream by the R. Tweed, extending for a mile, v.-c. 68, E. C. WALLACE; *by canal, Higham, W. Kent, v.-c. 16, E. C. WALLACE.

153/1. MEDICAGO FALCATA L. Shalford Common, near Guildford, Surrey. First seen here in 1917, and under observation since. It blossoms each year but never sets seeds, F. CLARKE. The var. *tenuifoliolata* Vuyck quoted in *Fl. Surrey* (p. 230) at Pewley Hill, Guildford, is no longer in existence there, having been destroyed by too vigorous trimming.

†153/1b. M. FALCATA L., var. TENUIFOLIOLATA Vuyck. Between Dawes Green and Betchworth, Surrey, A. L. STILL.

†153/4b. M. HISPIDA Gaertn., var. DENTICULATA (Willd.). Scilly Isles, Miss E. S. TODD.

†155/19. TRIFOLIUM AGRARIUM L. Pondtail, Fleet, N. Hants, v.-c. 11, Lt.-Col. G. WATTS; tip, Bristol, v.-c. 6, 1933, SANDWITH.

155/20b. T. PROCUMBENS L., var. MAJUS Koch. Bramshot, N. Hants, v.-c. 11, Lt.-Col. G. WATTS.

166/1. ASTRAGALUS GLYCYPHYLLOS L. Taynton, Burford, Oxon, new station for district 5 (Isis) of the *Fl. Oxon*, T. H. LEE per H. W. POWELL; Chilham, E. Kent, JOHN JACOB.

†166/4. A. CICER L. Waste ground, Burton-on-Trent, R. C. L. BURGES.

†170/1. CORONILLA VARIA L. Stone wall—not near a garden—Swindon, v.-c. 7, J. D. GROSE.

176/4. VICIA OROBUS DC. In one spot on the Mendips, Somerset, not very abundant, but apparently increasing, H. S. REDGROVE.

178/3. LATHYRUS TUBEROSUS L. Portishead Dock, N. Somerset, 1933, J. GIBBONS.

183/2. PRUNUS PADUS L. Foxcote, E. Gloster, v.-c. 33, Miss L. ABELL.

†184/4. SPIRAEA TOMENTOSA L. Quite naturalised in a copse near Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

*185/26. RUBUS SCHEUTZII Lindeb. Roadside, Abbethune, Arbroath, Angus, 1932, R. and M. CORSTORPHINE, teste W. WATSON.

*185/35. R. VILLICAULIS Koehl. Between Lethnot and Edzell, Angus, 1932, R. and M. CORSTORPHINE, teste W. WATSON.

*185/36. R. ATROCAULIS P. J. M. (*rectangulatus* Maass.). Magdalen Green, Dundee; Westwater at Edzell, 1932, R. and M. CORSTORPHINE, teste W. WATSON.

*185/56. R. SCHLECHTENDALII Weihe. Edzell, Angus, 1932, R. and M. CORSTORPHINE, teste W. WATSON.

185/92. R. ECHINATUS Lindl., f. or hybr. (Ref. No. Z.508.) Stem stout, low arching, purple. Petals faint lilac or white, ovate, obtuse. Styles green, exceeded by the white stamens. Wood, near Chinnor, Oxon, P. G. BEAK. "*R. echinatus* Lindl., a f. or hybrid," H.J.R.

185/92. R. ECHINATUS Lindl. (Ref. No. Z.502.) Stems arching, rather low, but stout. Petals lilac, elliptic obtuse, not contiguous. Styles green, exceeded by the white stamens. Hillside, Chinnor, Oxon, P. G. BEAK. "*R. echinatus* Lindl., which is not the same as *R. discerptus* P. J. Muell," H.J.R.

*185/94. R. CENOMANENSIS Sudre. Muirhead of Liff; Arbroath-Dundee Road, 1932, R. and M. CORSTORPHINE, teste W. WATSON. New to Scotland.

*185/110. R. FUSCUS W. & N. Between Tannadice and Memus; near Cononsyth, Arbroath, Angus, 1932, R. and M. CORSTORPHINE. Var. HYPOSERICEUS Sudre. Greens of Gardyne, Angus, 1932, R. and M. CORSTORPHINE, teste W. WATSON.

185/115. R. SCABER W. & N. (Ref. No. Z.488.) Stems low-arching, rather weak. Sepals reflexed. Petals white, elliptic; styles green, shorter than the white stamens. Under oak-wood, Bagley Wood, Berks, P. G. BEAK. "The Boar's Hill plant which Focke taught up to put under R. SCABER W. & N.," H.J.R.

189/4. POTENTILLA ARGENTEA L. Casual, Avonmouth Docks, W. Gloster, 1933, J. GIBBONS.

*189/6. P. VERNA L. Chalk railway embankment, Micheldever Station, N. Hants, v.-c. 12. Its origin here unknown; it occurs in about half a dozen strong tufts quite high up the slope of the embankment. Possibly introduced by the agency of the railway from Bristol, Lt.-Col. G. WATTS; Axbridge, N. Somerset, and abundant at Durdham Down, Bristol, Gloster, H. S. REDGROVE.

†189/11. P. NORVEGICA L. Roadside between Fleet and Aldershot, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

*189/25. P. PALUSTRIS Scop. Near Chingford, Epping Forest, v.-c. 18, removes the exception as to this v.-c. (London Nat. Hist. Soc.), J. ROSS.

*190/4. ALCHEMILLA MINOR Huds. Near West Wellow, S. Hants, v.-c. 11, P. M. HALL.

191/2. AGRIMONIA ODORATA (Gouan) Mill. Bramshot and Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

*†191/3. A. AGRIMONOIDES L. Kinnordy, Angus, R. and M. CORSTORPHINE, det. A. J. WILMOTT.

193/4. POTERIUM OFFICINALE (L.) A. Gray. Near Burley, S. Hants, v.-c. 11, Miss HARDCASTLE.

194/19(l). ROSA TOMENTOSA, var. DIMORPHA (Bess.) Des. Crianlarich, Mid Perth, v.-c. 88, E. C. WALLACE. Det. A.H.W.-D.

*194/21(b). R. VILLOSA L., var. b. MOLLIS Smith [= ROSA MOLLIS Smith, var. a. TYPICA Wolley-Dod] (*fide* A. H. Wolley-Dod, who saw my two herbarium specimens of my Ref. No. 376 in May 1926; and two specimens of my Ref. No. 4887, one specimen of my Ref. No. 4888, and James Sinclair's one specimen of his Ref. No. 969, on 11th November 1933).—(1) Ref. No. 376, grassy banks at burnside, 220 feet above mean sea-level, Red Glen, between Burandie and Dwarfie Hamars, Hoy, Orkney, 16th September 1914, H. H. Johnston. Native. Rare. Plants in unripe fruit. (2) Ref. Nos. 4887 and 4888, heathery, grassy, rocky ravine at burnside, 410 feet above mean sea-level, west side of Nowt Bield, Ward Hill, Hoy, Orkney, 27th September 1933, H. H. JOHNSTON. Native. Rare.

194/21d. R. MOLLIS Sm., f. CAERULEA Woods. *Coldstream Bridge, Cheviotland, v.-c. 68, E. C. WALLACE. Det. A.H.W.-D.

ROSA NOTES FOR 1933, BY EDMUND B. BISHOP.

The following are a few additions to those mentioned in other communications of mine, printed elsewhere in this Report, and also to those commented on by me in the Report of the Exchange Section. They arise out of personal submissions to me by the members named.

As in all my notes on *Rosa*, "N.C.R." means new to Col. Wolley-Dod's own records, whilst the nomenclature is that of his "Revision of the British Roses." The corresponding numbers of the "British Plant List," 2nd edition, have been inserted for convenience of reference.

Collected by Miss E. S. Todd in West Cornwall, during 1933, being N.C.R.s for v.-c. 1:—

194/7. R. CANINA L., var. DUMALIS (Bechst.) Dum. Crowles, near Penzance.

194/7b. R. CANINA L., var. DUMALIS (Bechst.), f. CLADOLEIA (Rip.). Devoran.

194/7e. R. CANINA L., var. BISERRATA (Mér.) Baker. Devoran.

Collected by Mr P. G. Beak in Oxfordshire, during 1933, being N.C.R.s for v.-c. 23:—

194/5h. R. STYLOSA Desv., var. SYSTYLA (Bast.) Baker, f. LANCEOLATA Lindl. Bampton. (Ref. No. Z.540).

194/10g. R. DUMETORUM Thuill., var. CALOPHYLLA Rouy. Bampton. (Ref. No. Z.543).

194/8f. Also collected by Mr Beak at Bampton, Oxon, v.-c. 23, is an interesting Rose submitted by him as *R. canina* L., var. *verticillacantha* (Mér.) Baker, f. *Lemaitrei* (Rip.) W.-Dod ?. Mr Beak sent gatherings from three different bushes, which seem practically identical in form, all irregularly serrate only. Wolley-Dod says that *Lemaitrei* has biserrate leaflets, and it is included by Keller in his Group C. (Biserrato-Compositae). My own decided opinion (for what it is worth) is that Mr Beak's Z.310, 311, and 541 all come under var. *hirtella* Chr., which is included in Keller's Group B (Transitoriae) and has passing mention in Wolley-Dod's "Revision," p. 40 (under *Lemaitrei*). These sheets have not yet been submitted to Col. Wolley-Dod. Unless he adopts *hirtella*, of course they must remain under *Lemaitrei*.

194/20e. Amongst other Roses submitted by Mr Beak, but collected by Mr T. R. Peace, in Mid Perth, is one which I think is *R. Sherardi* Davies, var. *typica* W.-Dod, f. *pseudo-mollis* W.-Dod (= *R. tomentosa* Sm., var. *pseudo-mollis* E. G. Baker). As this would be an N.C.R. for the well-worked v.-c. 88, perhaps I had better give it as such with a ?.

Although not an N.C.R., the following note, recording a slight extension of the area of the only known station for one of our very rarest Roses, may be of interest to critical students of the genus:—

194/11g. R. DUMETORUM Thuill., var. SETICAULIS W.-Dod. On August 16th, 1933, my sister (Mrs C. L. Wilde), Mr Biddiscombe and I set out on a long-delayed attempt to find this elusive floral aristocrat of our adopted county, guided solely by the note in *Flora of Surrey* (Salmon), p. 673.

We all know how difficult it usually is to locate a desired plant, even when furnished with elaborate instructions. Mr Biddiscombe and I, working the problem out beforehand on the 1-inch Ordnance map, were each quite certain as to the exact spot. Such spots are about a mile apart, and at neither did we find our Rose. My sister came out with no pre-conceived notions on the subject, but at a nondescript junction of lanes suddenly said " I am going down here," and went down there, ignoring our sceptical protests. A very few minutes later she climbed over a stile into a field, and then strolled along by the hedge examining Roses, we meekly following doing likewise. After proceeding thus for about 50 yards, we were quietly informed that she had a Rose with pubescent leaflets, with acicles on branches and glands on peduncles. With delight and no little surprise we hurried up to the bush, by which time subfoliar glands had also been added. The diagnosis was now fairly obvious, seemingly it must be *seticaulis*, though not an absolute fit by the book description.

But this is not the end of the story. In due course I sent specimens to Col. Wolley-Dod, accompanied by a rough sketch-plan showing the actual situation of the bush. Here are extracts from his reply:—

" Most interesting. Not exactly my *seticaulis*, nor from the same bush, but it can go under that name. The chief differences are as follows:—Your leaflets are mostly more truncate, or at least rounded at base, and are narrower in proportion to their length than mine, which have quite rounded sides. Your petioles are much more glandular and pubescent, but strikingly long stipules agree. Your fruit is subglobose, mine ovoid, quite 1½ times as long as broad. Your styles are longer and more hispid, but I think mine are more definitely hispid than I have described them. . . . Mrs Wilde's is a new bush, hardly a new station."

We did not make any considerable gathering from this bush, but I will send specimens (as far as they can be spared) to the first three or four members, *actively* interested in the genus, who apply to me for them. If possible, I will distribute further specimens to Exchange members next year.

195/1b. PYRUS MALUS L., var. PARADISIACA L. Foxcote, E. Gloster, v.-c. 33, MISS L. ABELL.

195/2. P. COMMUNIS L. Foxcote, E. Gloster, v.-c. 33, MISS L. ABELL.

*195/10. SORBUS PORRIGENS Hedl. Castle Coch Woods, Glamorgan, v.-c. 41, 1933, A. J. WILMOTT and E. VACHELL.

*195/13. PYRUS ARIA (L.) Ehrh. × AUCUPARIA (L.) Ehrh. = P. PINNATIFIDA Ehrh. Ashley, S. Hants, v.-c. 11, P. M. HALL and Rt. Hon. H. T. BAKER, det. A. J. WILMOTT.

†198/1. AMELANCHIER CANADENSIS (L.) Med. Naturalised near West Wellow, S. Hants, v.-c. 11, G. W. PIERCE; Canal bank, near Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†198/3. A. LAEVIS Wieg. Holmsley, S. Hants, v.-c. 11, Dr R. W. BUTCHER and J. CHAPPLE, det. FRASER.

199/10. SAXIFRAGA HYPNOIDES L. Very abundant in one spot at Cheddar, to which it is restricted in the district—its most southerly station in Britain, H. S. REDGROVE.

199/17. S. GRANULATA L. Cheam, Surrey, a new station, v.-c. 17, A. L. STILL.

*207/5. RIBES ALPINUM L. Near Dunninald, Angus, R. & M. CORSTORPHINE.

*209/1. TILLAEA MUSCOSA L. Blackmoor, N. Hants, v.-c. 12. Occurs in several places in Woolmer Forest. It is somewhat remarkable that it should not have been recorded before from a habitat very typical for the plant, Hon. W. J. L. PALMER and P. M. HALL.

213/1. DROSERA ANGLICA × ROTUNDIFOLIA, with both parents. Lower slopes of Ben Douran above Bridge of Orchy, v.-c. 98, Argyll, R. MACKECHNIE and E. C. WALLACE.

214/1. HIPPURIS VULGARIS L. Bowling, Dumbarton, v.-c. 99, R. MACKECHNIE.

216/1. MYRIOPHYLLUM SPICATUM L. Basingstoke Canal, Odiham, N. Hants, v.-c. 12; Pevensey Levels, E. Sussex, v.-c. 14, E. C. WALLACE.

216/2. M. ALTERNIFLORUM DC. Frensham Little Pond, Surrey, v.-c. 17; shores of Loch Tay, Killin, Mid Perth, v.-c. 88, E. C. WALLACE.

216/3. M. VERTICILLATUM L. Marsh ditches near Lewes, Sussex, v.-c. 14, E. C. WALLACE.

216/3b. M. VERTICILLATUM L., var. PECTINATUM (DC.). Wicken Fen, Cambs, v.-c. 29, H. PHILLIPS.

217/2. CALLITRICHE OBTUSANGULA Le Gall. Near Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

*217/3. C. PALUSTRIS L. Farlington Marshes, S. Hants, v.-c. 11, Dr W. A. SLEDGE and P. M. HALL, det. W. H. PEARSALL. *Austwick Moss, v.-c. 64, H. W. PUGSLEY. Excellent fruiting examples.

217/5. C. INTERMEDIA Hoffm. Pool near Bewdley, Worcs., v.-c. 37, E. C. WALLACE.

217/5d. C. intermedia Hoffm., var. homoiophylla Godron. Cauldshiels Loch, near Galashiels, v.-c. 79, A. Douglas Simpson.

217/6. C. autumnalis L. *Cauldshiels Loch, near Galashiels, v.-c. 79, N. Douglas Simpson; Loch Clunie, E. Perth; Loch Ussie, near Dingwall, E. Ross; Lintrathen Reservoir, Angus, G. Taylor; *Eaglesham, Renfrew, v.-c. 76, R. Mackechnie.

*219/1. Lythrum Salicaria L. Near Friockheim and at Forfar Loch, Angus, R. & M. Corstorphine.

220/14. Epilobium palustre L. With white flowers, Pevensey Level, E. Sussex, v.-c. 14, E. C. Wallace.

221/1. Ludwigia palustris (L.) Ell. This species fruited very freely this year (1933) in the station S.E. of Lyndhurst, where it is very abundant. Last year it was discovered by Mrs Tindall in a new station, extending its range several miles to the south, and it was rediscovered here this year independently by Mrs Ashby The new station is one much frequented by botanists and it is possible that the plant may have been introduced here accidentally or otherwise by human agency, P. M. Hall.

*234/1. Carpobrotus edulis N. E. Br. (*Mesembryanthemum edule* L.). In quantity on cliffs of the Cornish coast near Wadebridge, v.-c. 2, R. J. Flintoff.

*239/1. Eryngium campestre L. Waste ground between the docks and the sand-dunes at Port Talbot, Glamorgan, v.-c. 41, R. L. Burges.

245/3. Bupleurum rotundifolium L. On waste ground near Skipton, Yorks, v.-c. 63. New to the Craven district, T. H. Holmes and J. N. Frankland.

†245/6. B. protractum Hoffm. et Link. (*B. subovatum* Link). Near Lewes, Sussex, Miss K. Pickard.

246/1. Trinia glauca Dum. Bleadon and Uphill, N. Somerset; plentiful on Durdham Down, Bristol, Gloster, just blooming, April, H. S. Redgrove.

251/1. Sison Amomum L. Common at Staplehurst and other places in Kent; I never saw it in the Lake District, W. H. Pearsall.

†252/1. Falcaria vulgaris Bernh. Portishead Dock, N. Somerset, 1933, Sandwith.

277/2b. Heracleum Sphondylium L., var. angustifolium Huds. Bewdley, Worcs., v.-c. 37, J.B.D. ex E. C. Wallace.

†279/1. CORIANDRUM SATIVUM L. Waste heap, Welwyn, Herts, v.-c. 20, H. PHILLIPS.

*285/2. CORNUS SUECICA L. Near the top of Whitecombe, Dumfries, v.-c. 72, among heather, July 30, 1931, Miss H. M. LOGAN HOME.

*287/3. SAMBUCUS EBULUS L. Near Polnoon Castle, Renfrew, v.-c. 76, R. MACKECHNIE.

291/2b. LONICERA PERICLYMENUM L., var. QUERCIFOLIA Ait. Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

296/5. GALIUM SYLVESTRE Poll. Plentiful at Cheddar, N. Somerset, H. S. REDGROVE.

*296/5d. G. SYLVESTRE Poll., var. HISPIDUM Schrader. Heathy ground, Marlborough, v.-c. 7, J. D. GROSE.

296/7c. G. PALUSTRE L., var. LANCEOLATUM Uechtr. Woodwalton Fen, Hunts, H. PHILLIPS.

301/1. VALERIANA OFFICINALIS L. Cheddar, N. Somerset, apparently growing with *V. sambucifolia* Mik., but these two so-called species seem to me to run into one another, H. S. REDGROVE.

*304/4. VALERIANELLA CARINATA Loisel. Old Basing, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

306/1. DIPSACUS SYLVESTRIS Huds. (D. FULLONUM L.). Near Lewes, Sussex, Miss K. PICKARD.

†306/3. D. SATIVUS (L.). (FULLONUM auct.). Waste heap, Welwyn, Herts, v.-c. 20, H. PHILLIPS.

†307/2. LEPICEPHALUS SYRIACUS (Schrad.). Newport, Isle of Wight, v.-c. 10, J. W. LONG.

†308/2. SCABIOSA ATROPURPUREA L. A continental species naturalised at Folkestone (see *Fl. Kent*, 187). On the Leas, Folkestone, September 1931, Miss P. M. PEARSALL.

†318/1. ASTER SALIGNUS L. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS, det. KEW.

†318/4. A. NOVI-BELGII L. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†318/7. A. TRADESCANTII L. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS, det. BRIT. MUS.

324/5b. FILAGO MINIMA Pers., var. SUPINA Rouy & Camus. Sandy ground, Pondtail, Fleet, N. Hants, v.-c. 12. A rather remarkable form with horizontal branches, simulating *F. spathulata*, Lt.-Col. G. WATTS and P. M. HALL, det. E. DRABBLE.

328/1. GNAPHALIUM LUTEO-ALBUM L. Avonmouth Docks, W. Gloster, 1933, SANDWITH.

†341/3. XANTHIUM SPINOSUM L. In fine flower near Thirsk, Yorks, v.-c. 62, September 30, 1933, Miss C. ROB.

†356/1. HEMIZONIA PUNGENS Torr. & Gray. Waste ground, Stoke-on-Trent, new to N. Staffs, E. S. EDEES.

†368/1. ANTHEMIS TINCTORIA L. North Foreland Golf Course, Isle of Thanet, v.-c. 15, GUY CHARTERIS.

*368/4. A. COTULA L. Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

†368/8. A. RUTHENICA M. Bieb. Avonmouth Docks, W. Gloster, 1933, J. GIBBONS.

371/1. MATRICARIA INODORA L. Lulworth Cove, Dorset, v.-c. 9, Miss P. A. LEAKE.

*†371/2. M. CHAMOMILLA L.—Ref. No. 4875, grassy, gravelly, waste ground near a wooden poultry-house, 160 feet above mean sea-level, Hamar House, Stromness, Mainland, Orkney, 6th September 1933, H. H. JOHNSTON. Not native. A new record for this non-native species for v.-c. 111, found on 6th September 1933. Note.—In Magnus Spence's *Flora Orcadensis*, p. 37 (1914), *Matricaria Chamomilla* L. is recorded by him from Beaquoy, Birsay, Mainland, Orkney, but the four specimens of his Ref. No. 352, collected by him at this station in 1898 and labelled under the name of this species, are, undoubtedly, *Anthemis nobilis* L. See "Bot. Exch. Club Distributor's Report for 1921," vol. vi, part iv, p. 564 (September 1922).

†378/16. ARTEMISIA BIENNIS L. Waste ground, Stoke-on-Trent, new station in N. Staffs, E. S. EDEES; Byfleet, Surrey, v.-c. 17, H. PHILLIPS.

†383/7. SENECIO SQUALIDUS L. Railway bridge, Tonbridge, W. Kent, v.-c. 16, E. D. MORGAN and G. E. SHAW; *Warrenley, near Redcar, N.E. Yorks, v.-c. 62, Miss CATHERINE ROB.

*383/8. S. VISCOSUS L. Shingle. Ben Lester Burn, Arran, v.-c. 100, R. MACKECHNIE.

†385/1. CALENDULA OFFICINALIS L. Waste heap, Welwyn, Herts, v.-c. 20, H. PHILLIPS.

†389/1. ECHINOPS SPHAEROCEPHALUS L. Railway bank, Uffington, v.-c. 22, J. D. GROSE.

396/1. CNICUS ERIOPHORUS Roth. Near Andoversford, E. Gloster. v.-c. 33, Miss L. ABELL.

396/4. C. ACAULE (L.) Weber × TUBEROSUM (L.) All. Near Avebury, North Wilts, v.-c. 7, J. E. LOUSLEY.

396/8b. C. ARVENSE (L.) Scop., var. MITE Koch. Byfleet, Surrey, H. PHILLIPS.

396/8c. C. ARVENSIS Hoffm., var. SETOSUS M. Bieb. A bed of this variety in a lane at Silsden, Yorks, v.-c. 64, T. H. HOLMES and J. N. FRANKLAND.

396/9. C. PALUSTRE (L.) Scop. × PRATENSE (Huds). DC. (= × C. FORSTERI Sm.). Swamp west of Hedge Court Mill-pond, Surrey, v.-c. 17. *C. pratense*, f. *pseudo-Forsteri* (Wats.) also occurred. As there is a proposal to utilise this lake for boating, this rare hybrid, which was recorded thence by Beeby many years ago, is likely to be lost, J. E. LOUSLEY.

405/11b. CENTAUREA NEMORALIS Jord., var. DIVERSIFOLIA C.E.B. Tillywhim, near Swanage, Dorset, H. PHILLIPS.

405/11c. C. NEMORALIS Jord, var. SUBINTEGRA C.E.B. Highdown, near Hitchin, Herts, v.-c. 20; Chippenham Fen, Hunts, and Wicken Fen, Cambs., v.-c. 29, H. PHILLIPS.

405/11d. C. NEMORALIS Jord., var. MINIMA C.E.B. High Down, near Hitchin, Herts, v.-c. 20, H. PHILLIPS.

405/11f. C. NEMORALIS Jord., var. DEBEAUXII C.E.B. High Down, Herts, v.-c. 20, H. PHILLIPS. All teste C. E. BRITTON.

405/11c. C. NEMORALIS Jord., var. SUBINTEGRA C.E.B. Bramble Reed Lane, Matfield, Kent. W. H. PEARSALL.

405/13g. C. SCABIOSA L., f. INCISA C.E.B. in *Rep. B.E.C.*, 1922, p. 770. Letchworth, Herts, v.-c. 20, H. PHILLIPS.

405/16. C. ASPERA L. Waste ground between the docks and the sand-dunes at Port Talbot, Glamorgan, v.-c. 41, R. L. BURGES.

†405/35. C. PALLESCENS Delile. Newport, Isle of Wight, v.-c. 10, J. W. LONG.

†405/43. C. DILUTA Ait. Waste heap, Welwyn, Herts, v.-c. 20, H. PHILLIPS.

†407/3. CARTHAMUS TINCTORIUS L. Near Lewes, Sussex, Miss K. PICKARD.

*409/1. CICHORIUM INTYBUS L. Clanchlands, Arran, v.-c. 100, R. MACKECHNIE.

410/1. ARNOSERIS MINIMA (L.) Schw. & Koerte. Near Bramshot Links, Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS; Isle of Oxholme, N. Lincoln, v.-c. 54, Dr H. B. W. SMITH.

411/1b. LAPSANA COMMUNIS L., var. PUBESCENS Koch. Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

416/3. CREPIS BIENNIS L. Winchfield, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†416/11. C. SETOSA Haller f. In fair abundance on waste ground, Splott, Cardiff, v.-c. 41, Miss E. VACHELL.

419/54. HIERACIUM LIMA Hanb. Cheddar, N. Somerset, specimens sent to Kew Hbm., H. S. REDGROVE.

422/2b. LEONTODON AUTUMNALIS L., var. PRATENSIS (Koch). Ben More, Mid Perth, v.-c. 88; Ben Douran, Argyll, v.-c. 98, R. MACKECHNIE and E. C. WALLACE.

*425/6. LACTUCA ALPINA Benth. (*Mulgedium alpinum* Less.). In moist rocky situation above Ullswater at about 500-600 ft. elevation, between Patterdale and Pooley Bridge, Cumberland, v.-c. 70, Miss AGNES K. SWAINE.

427/3e. SONCHUS ASPER Hill, var. INTEGRIFOLIUS Wallr. Hitchin, Herts, v.-c. 20, H. PHILLIPS.

427/4f. S. OLERACEUS L., var. LACERUS Wallr. Wooton Pillinge, Beds, v.-c. 30, H. PHILLIPS.

†427/5. S. TENERRIMUS L. Biggleswade, Beds, v.-c. 30, H. PHILLIPS.

433/1. WAHLENBERGIA HEDERACEA Reichb. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

435/2. CAMPANULA LATIFOLIA L. Near the R. Wey at Guildford, Surrey, in quantity, F. CLARKE.

435/5. C. RAPUNCULOIDES L. Near West Wellow, S. Hants, v.-c. 11, G. W. PIERCE.

439/1. OXYCOCCUS QUADRIPETALUS Gilib. Woolmer Forest, N. Hants, v.-c. 12, Hon. W. J. L. PALMER and P. M. HALL; still on Ockley Common in abundance, Surrey, v.-c. 17, E. C. WALLACE. [A most interesting record. We have often been surprised to find that so many botanists fail to recognise this species unless in flower.—ED.].

†443/1. GAULTHERIA SHALLON Pursh. Well established on the south slope of Leith Hill, Surrey, district Xa, Miss FLORA RUSSELL.

*453/2. PYROLA MEDIA Sw. Hindon, Wilts, v.-c. 8. First seen in 1931 and again in 1932 but not until 1933 were flowers observed and the plant's identity established. It has apparently been known to the village children as "a sort of Lily of the Valley" for many years, Miss BARBARA GULLICK.

453/3. P. MINOR L. Plantation on downs near Crundale, Kent. This confirms an old record for district 7 in *Fl. Kent.* There were about a dozen plants, flowers just opening, May 20, 1933, W. H. PEARSALL and H. D. STANLEY.

457/1. LIMONIUM VULGARE Mill. Holme, W. Norfolk, v.-c. 28, H. PHILLIPS.

457/5. L. BINERVOSUM C. E. Salmon. Holme, W. Norfolk, v.-c. 28, H. PHILLIPS.

467/3. ANAGALLIS FOEMINA Mill. In gardens at Dover, Kent, J. JACOB; in garden at The Green, Millom, Cumberland, W. H. PEARSALL.

469/1. SAMOLUS VALERANDI L. Lulworth Cove, Dorset, v.-c. 9, Miss P. A. LEAKE.

477/1. BLACKSTONIA PERFOLIATA Huds. Two new stations for district 5 (Isis) of Oxon, v.-c. 23—Stonesfield, W. D. CAMPBELL; Leafield, Swinbrook Common, G. GORDON. Both per H. W. POWELL.

478/4. ERYTHRAEA PULCHELLA Fr. (CENTAURIUM PULCHELLUM (Sw.) Dr.) Edge of dried-up pond, Bampton, Oxon, P. G. BEAK.

478/4c. CENTAURIUM PULCHELLUM Sw., var. SIMPLICISSIMUM Schmidt. Kenfig sand dunes, Glamorgan, v.-c. 41, 1933, ELEANOR VACHELL, teste J. S. GILMOUR.

†485/9. GILIA SQUARROSA H. & A. Appeared on the newly-made lawn of a house at Topcliffe, 3 miles from Thirsk. The plant was kindly determined by Mr A. J. Wilmott. It is a native of California, and as the doors of the house came as planks directly from that country the plant's origin was easily traced, Miss CATHERINE M. ROB.

486/1. POLEMONIUM CAERULEUM L. Small marsh near Shalford Church, Surrey, probable garden escape, J. G. LAWN.

†492/2. PLAGIOBOTHRYS STIPITATUS (Greene) Johnston. (*Allocarya stipitata* Greene). Avonmouth Docks, W. Gloster, 1933, SANDWITH.

†493/2. LAPPULA ECHINATA Gilib. Bramshot, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†494/1. ASPERUGO PROCUMBENS L. Waste ground, Bristol, v.-c. 34, 1933, SANDWITH.

506/7. MYOSOTIS SYLVATICA (Ehrh.) Hoffm. Quarry near Upton Grey, N. Hants, v.-c. 12, presumably not native but well established, Lt.-Col. G. WATTS.

507/2. LITHOSPERMUM PURPUREO-CAERULEUM L. Abundant in two places near Cheddar, N. Somerset, H. S. REDGROVE; *rubbish tip on the outskirts of Burton, v.-c. 39, R. C. L. BURGES.

*†509/2. ECHIUM PLANTAGINEUM L. In cultivated ground near Folkestone, probably introduced with seed potatoes from the Channel Islands, JOHN JACOB.

†515/1. CUSCUTA EPILINUM Weihe. On *Linum* at extreme north of Northamptonshire, with the two following species, E. B. BISHOP.

515/2. C. EUROPAEA L. Parasitic on various herbaceous plants but not on adjacent nettles, bushy and grassy tract of land in the extreme north of Northamptonshire, v.-c. 32, E. B. BISHOP.

515/4. C. TRIFOLII Bab. On clover at extreme north of Northamptonshire, E. B. BISHOP.

†515/7. C. SUAVEOLENS Ser. On beetroot in an allotment garden, Skipton, v.-c. 63, T. H. HOLMES and J. N. FRANKLAND, confirmed by KEW.

†516/1. LYCOPERSICUM ESCULENTUM Hill. Braunton Burrows, N. Devon, v.-c. 4, J. D. GROSE.

*†517/2. SOLANUM NIGRUM L. Flower border in a garden, 90 feet above mean sea level, Holland House, Papa Westray, Orkney, (1) 7th September 1933 (plant in flower and unripe fruit), and (2) 17th September 1933 (plant in unripe fruit and sparingly in flower and ripe fruit), WILLIAM TRAILL. Not native.

†517/9. S. TRIFLORUM Nuttall. Holy Island sands, Northumberland, E. C. WALLACE.

†517/14. S. SISYMBRIFOLIUM Lam. Newport, Isle of Wight, J. W. LONG.

†522/1. Datura Stramonium L. In the village near the station, Braunton, N. Devon, W. H. Pearsall and Dr F. R. E. Wright.

524/1. Hyoscyamus niger L. Pool Bottom, district 5 (Isis), Oxon, v.-c. 23, new station for this district, H. W. Powell; in fruiting condition, Braunton Burrows, N. Devon, in October, J. D. Grose.

*†524/1. H. niger L. Grassy, gravelly, waste ground near a wooden poultry-house, 160 feet above mean sea level, Hamar House, Stromness, Mainland, Orkney, (1) Ref. No. 4868 (plant in unripe fruit and sparingly in flower), 6th September 1933, and (2) Ref. No. 4881 (plant in unripe and ripe fruit mostly dehisced and most of the seeds shed), 22nd September 1933, H. H. Johnston. Not native. James Sinclair's specimen of his Ref. No. 962 was collected by him, in my company, from the same plant, on 22nd September 1933. A new record for this non-native species for v.-c. 111.

†527/5. Verbascum Blattaria L. Near West Wellow, S. Hants. v.-c. 11, G. W. Pierce.

532/1. Linaria vulgaris Mill. Lamlash shore, Arran, v.-c. 100, R. Mackechnie.

*532/7. L. minor Desf. Clarkston, Renfrew, v.-c. 76, R. Mackechnie.

532/24. L. spuria (L.) Mill. Peloriate form. E. Meon, S. Hants, v.-c. 11, F. Escombe.

532/25. L. Elatine (L.) Mill. Between Clanfield and Hambledon, S. Hants, v.-c. 11, P. M. Hall.

543/8b. Veronica Anagallis-aquatica L., b. glandulosa Dr. Sands of Barry, Angus, G. Taylor, comm. R. H. Corstorphine.

*543/9c. V. aquatica Benq., var. laticarpa Krösche. Ogbourne, N. Wilts, v.-c. 7, J. D. Grose.

†543/23. V. spuria L. Avonmouth Docks, W. Gloster. 1933, J. Gibbons.

†543/31. V. peregrina L. On the walled garden of Farington House, Farington, v.-c. 59, H. E. Bunker.

543/41. V. filiformis Smith. Ayr, v.-c. 75, R. Mackechnie.

545/5. Euphrasia nemorosa Löhr, near var. c. calcarea Pugsl. Holmsley, S. Hants, v.-c. 11, H. Phillips. Near var. d. collina Pugsl. Chippenham Fen, Cambs, v.-c. 29, H. Phillips.

545/5b. E. NEMOROSA Löhr, var. CILIATA Drabble. Sandy turf, St Helen's Spit, I. of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL, det. PEARSALL.

545/10. E. OCCIDENTALIS Wettst. Winspit, south of Worth, Matravers, Dorset, H. PHILLIPS; Brean Down, N. Somerset, v.-c. 6, CHAS. WATERFALL.

545/12b. E. FRIGIDA Pugsl., var. LAXA Pugsl. Ben More, Am Binnein, Coire Ardrain, Cam Chreag, Creagan Lochain, Creag na Caillich, Mid Perth, v.-c. 88; Glen Callater, S. Aberdeen, v.-c. 92; Ben Douran, Ben Dothaidh, Argyll, v.-c. 98, E. C. WALLACE and R. MACKECHNIE.

*545/15. E. MICRANTHA Reichb. Hatchett Pond, Beaulieu, S. Hants, v.-c. 11, H. PHILLIPS.

545/19(2). E. ANGLICA Pugsl. Highland Water, near Lyndhurst, S Hants, v.-c. 11, J. CHAPPLE.

546/4. BARTSIA VISCOSA L. In fine flower, September 10, 1933, near the bulb-farm, Braunton, N. Devon, W. H. PEARSALL.

550/2. OROBANCHE CARYOPHYLLACEA Sm. Near Dover, Kent, JOHN JACOB.

550/4. O. ELATIOR Sutton. Cold Ash, Newbury, Berks, v.-c. 22, Miss A. M. NEILD.

551/1. LATHRAEA SQUAMARIA L. Lyminge, E. Kent, v.-c. 15, J. JACOB.

552/2. UTRICULARIA MAJOR Schmidel. In flower, ditches in Easton marsh, Freshwater, I. of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL. Townsend, *Flora of Hants*, gives *U. vulgaris* for this station, but Rayner's *Supplement* and Drabble and Long's List (*Rep. B.E.C.*, 1931) both correctly give *U. major*. Only one species grows here and there is no other recorded station for either species in the Island. Druce, *Comital Flora*, gives v.-c. 10 for both species and this number should, therefore, be deleted in the case of *U. vulgaris*, P. M. HALL.

552/2. U. MAJOR Schmidel. In August 1929 Mr Francis Druce discovered a form of *Utricularia* in Oxwich Bay, Glamorgan. The plants were in abundance, but there was only one flower. With Miss E. Vachell the site was visited again in 1930, but no flowers were seen. In 1933 flowers were numerous and the species proved to be *U. major*, which has not been recorded for Glamorgan since 1907, E. VACHELL.

552/4. U. OCHROLEUCA Hartm. Loch Dochart, Lochan Lairig Cheile, Mid Perth, v.-c. 88, R. MACKECHNIE and E. C. WALLACE.

†554/1. ACANTHUS MOLLIS L. Menabilly, East Cornwall, v.-c. 2, J. D. GROSE, det. KEW.

558/1. MENTHA ROTUNDIFOLIA (L.) Huds. Abundant in many pastures away from houses between Tintern and Redbrook, Wye Valley, v.-c.s 34 and 35, J. E. LOUSLEY.

558/3. M. LONGIFOLIA (L.) Huds. Well established by River Cam, Little Chesterford, North Essex, v.-c. 19, A. W. GRAVESON and J. E. LOUSLEY.

558/3. × M. NILIACA Jacq., var. ALOPECUROIDES (Hull) Briq. Well established, Norton Heath, near Ongar, North Essex, v.-c. 19, A. W. GRAVESON and J. E. LOUSLEY.

558/3. M. LONGIFOLIA (L.) Hudson. Letchworth, Herts, v.-c. 20, H. PHILLIPS.
Var. b. NEMOROSA (Willd.). Letchworth, Herts, v.-c. 20, H. PHILLIPS.

*558/6. M. PIPERITA L. Clarkston, Renfrew, v.-c. 76, R. MACKECHNIE; *Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS, det. FRASER.

558/7. ×M. PALUSTRIS (Sole) Fraser. Valley near Mount, Cardiganshire, v.-c. 46, 1932, SANDWITH, det. FRASER.

558/7. M. AQUATICA L. [Ref. A.59]. Bampton, Oxon, August 1933, P. G. BEAK. "The dry summer has made the leaves of this smaller than usual, but by technical characters it cannot be separated from the type. The slender stems are due to their struggle with rank vegetation."—FRASER.

558/7. M. AQUATICA L. [Ref. Z.551]. Bampton, Oxon, August 1933, P. G. BEAK. "This simulates the variety *nicaeensis* Briq., but the upper leaves and their serratures are too acute, and the verticils or capitula are too large."—FRASER.

558/7. M. AQUATICA L. [Z.577]. Port Meadow, Oxford, September 1933, P. G. BEAK. "An approach to the var. *subglabra* Baker, but the upper part of the stem, the upper leaves and their petioles are too hairy. There is no exact line of demarcation between the type and the variety, for *M. aquatica* varies greatly between the very hairy *M. hirsuta* Hudson and the var. *subglabra* Baker."—FRASER.

558/7. M. AQUATICA L. [Z.578]. Port Meadow, Oxford, September 1933, P. G. BEAK. "An approach to the var. *subglabra* Baker, but the main stem and branches throughout, and the petioles of the leaves are too hairy."—FRASER.

558/7b. M. AQUATICA L., var. SUBGLABRA Baker. [Z.576]. Port Meadow, Oxford, September 1933, P. G. BEAK. "The leaves are large, and that is usually the case with subglabrous mints, because they grow in watery or very wet places."—FRASER.

558/9. ×M. VERTICILLATA (L.). Chippenham Fen, Cambs, v.-c. 29, H. PHILLIPS.

558/10. M. GENTILIS L., emend. Westend Common, Esher, new station for Surrey, A. L. STILL. This plant has a rather faint smell of Spearmint. Also at Leith Hill, Surrey, with the scent of *M. citrata*, H. W. PUGSLEY and A. L. STILL.

558/10. M. GENTILIS L. Killin, Mid Perth, v.-c. 88, E. C. WALLACE; East Meon, S. Hants, v.-c. 11, F. ESCOMBE, det. FRASER.

558/11. ×M. GENTILIS (L.), var. CARDIACA (Baker) Briq. By farm buildings, Sharpham Moor, near Glastonbury, N. Somerset, 1933, SANDWITH, det. FRASER.

*558/12. ×M. RUBRA Sm. Valley near Mount, Cardiganshire, v.-c. 46, 1932, SANDWITH.

558/13. M. ARVENSIS L., var. BREVIDENS Fraser. Holmwood Common, Surrey, v.-c. 17, J. E. LOUSLEY.

558/13. M. ARVENSIS L., f. HIRTIPES Fraser. Stoborough, Dorset, v.-c. 9, H. PHILLIPS.

558/13j. M. ARVENSIS L., var. DENSIFOLIATA Briq. [Ref. Z.550]. Cornfield, Bampton, Oxon, August 1933, P. G. BEAK. "The leaves of this variety are broadest at or near the base, and in open fields or amongst corn, it makes a much-branched densely leafy plant."—FRASER.

*558/14. M. PULEGIUM L. Near Braunton, N. Devon, v.-c. 4, W. H. PEARSALL and Dr F. R. E. WRIGHT.

560/1b. ORIGANUM VULGARE L., var. MEGASTACHYUM (Link). Seaton, S. Devon, v.-c. 3, E. C. WALLACE.

†565/1. MELISSA OFFICINALIS L. Near Hook Station, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†566/11. SALVIA BERTOLONII Vis. Waste ground, Burton-on-Trent, R. C. L. BURGES.

†566/17. SALVIA VERTICILLATA L. By Bramshot Links, N. Hants, v.-c. 12, Lt.-Col. G. WATTS; waste ground, Stoke-on-Trent, new to N. Staffs, E. S. EDEES.

572/2. SCUTELLARIA MINOR Huds. Found at Keasden near Clapham, Yorks, v.-c. 64, July 1933. First record for the Craven district of this vice-county, C. A. CHEETHAM.

573/2. PRUNELLA LACINIATA L. Cheddar, N. Somerset, sparingly, H. S. REDGROVE.

†575/2. SIDERITIS ROMANA L. Waste ground, Stoke-on-Trent, new to N. Staffs, E. S. EDEES.

577/1. STACHYS ALPINA L.×S. GERMANICA L. (×S. DIGENEA Legué). Spontaneously in Lady Davy's garden at Byfleet from parents of British origin. It agrees well with specimens collected by Legué in Herb. Brit. Mus., and with a useful note attached to the sheet. See also Salmon in *Journ. Linn. Soc.*, xliv, p. 357 (1919). J. E. LOUSLEY.

577/4. S. PALUSTRIS L. × SILVATICA L. (S. AMBIGUA Sm.). Near Spitchwick, Widecombe Parish, S. Devon, F. M. DAY.

*577/7. S. ANNUA L. Thornton Dale, North Riding, Yorks, v.-c. 62, found by Mr James Green on limestone, R. J. FLINTOFF.

577/13. S. OFFICINALIS Trevis. (S. BETONICA Benth.). Near Weymouth, Dorset, with pure white flowers, R. MILES.

581/6. LAMIUM AMPLEXICAULE L. Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†583/1. BALLOTA RUDERALIS Sw. Par, E. Cornwall, v.-c. 2, Miss E. S. TODD.

586/2. TEUCRIUM SCORDIUM L. Braunton Burrows, September 1933, W. H. PEARSALL and Dr F. R. E. WRIGHT.

586/3. T. BOTRYS L. Near Harewood, N. Hants, v.-c. 12, an interesting extension of range westwards from the well-known Micheldever station, W. SIMPSON; in a field at Godmersham, E. Kent, where it has been growing for some years, JOHN JACOB.

587/4. AJUGA CHAMAEPITYS (L.) Schreb. Near Harewood, N. Hants, v.-c. 12, W. SIMPSON.

593/3. HERNIARIA HIRSUTA L. Milber Down, Newton Abbot, S. Devon, where it had not been seen for 15 years, Rev. W. KEBLE MARTIN.

†596/6. AMARANTUS RETROFLEXUS L. Lockerley, S. Hants, v.-c. 11, Lt.-Col. W. A. PAYN; Headington, Oxford, v.-c. 23, J. CHAPPLE.

600/1. CHENOPODIUM RUBRUM L. Near Aldershot, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

600/5. C. URBICUM L. Penryn, W. Cornwall, v.-c. 1, Miss E. S. TODD.

600/7. C. OPULIFOLIUM Schrader. Scilly Isles, v.-c. 1, Miss E. S. TODD; Hitchin, Herts, v.-c. 20, H. PHILLIPS.

600/8k. C. VIRIDE L. (C. SUECICUM Murr). Invergowrie, Angus, v.-c. 90, R. & M. CORSTORPHINE.

600/13. C. GLAUCUM L. Near Aldershot, N. Hants, v.-c. 12, Lt.-Col. G. WATTS. This species is recorded in *Comital Flora* from both v.-c.s 11 and 12, but neither Townsend's *Flora* nor Rayner's *Supplement* gives any records from the mainland of Hants, P. M. HALL; Ascot Place, Berks, v.-c. 22, A. H. CARTER and J. E. LOUSLEY; Byfleet, Surrey, v.-c. 17, H. PHILLIPS.

600/15. C. POLYSPERMUM L. Garden weed at Fishbourne Ferry, Isle of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL.

*606/6. ATRIPLEX DELTOIDEA Bab. Above Tayock, Montrose, and North Water Bridge, Angus, R. & M. CORSTORPHINE. Var. b. PROSTRATA Bab. Sands, Montrose, Angus, R. & M. CORSTORPHINE.

606/8. A. MARITIMA Hallier (ARENARIA Woods). Sands, Montrose, Angus, R. & M. CORSTORPHINE.

†606/11. A. TATARICA L. Lurgies, Montrose, Angus, 1914, R. & M. CORSTORPHINE. Dr Aellen suggests *A. oblongifolium* W. & K. Pl. Rar. Hung., iii, 278, t. 211, as the name of this plant.

611/1. SALICORNIA RADICANS Sm. Newtown, I. of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL.

611/2. S. LIGNOSA Woods. Porchester and N. Hayling, S. Hants, v.-c. 11, and Pagham, W. Sussex, v.-c. 13, Dr W. A. SLEDGE and P. M. HALL; Dawlish Warren, S. Devon, FRANCIS M. DAY.

611/3. S. DOLICHOSTACHYA Moss. Porchester, S. Hants, v.-c. 11; Pagham, W. Sussex, v.-c. 13, Dr W. A. SLEDGE and P. M. HALL; Prinstead, W. Sussex, v.-c. 13, and an erect form from N. Hayling, S. Hants, v.-c. 11, P. M. HALL.

611/4b. S. EUROPAEA L., var. STRICTA (Meyer). N. Hayling, S. Hants, v.-c. 11, P. M. HALL.

611/5. S. RAMOSISSIMA Woods. Newtown, I. of Wight, v.-c. 10; Pagham, W. Sussex, v.-c. 13, Dr W. A. SLEDGE and P. M. HALL; N. Hayling, S. Hants, v.-c. 11, with forma *simplex* and f. *brachiata* (teste Wilmott), P. M. HALL.

611/7. S. GRACILLIMA (Towns.) Moss. Newtown, I. of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL. A very small red-coloured plant which showed stereids when sectioned by Sledge; superficially very different in appearance from the orange-brown Pagham plant determined by Wilmott as this species in 1932.

611/8. S. APPRESSA Dum. N. Hayling, S. Hants, v.-c. 11, P. M. HALL, det. WILMOTT.

611/9. S. DISARTICULATA Moss. N. Hayling, S. Hants, v.-c. 11, P. M. HALL; Newtown, I. of Wight, v.-c. 10, J. W. LONG.

615/5c. POLYGONUM AMPHIBIUM L., var. GLANDULOSUM Schönheit. Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

*615/8. P. NODOSUM Pers. (PETECTICALE (Stokes) Dr.). Olympia Sidings, Selby, v.-c. 62, W. A. SLEDGE.

615/10. P. MITE Schrank. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

615/11. P. MINUS Huds. Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

615/15. P. AEQUALE Lindm. Byfleet, Surrey, v.-c. 17, H. PHILLIPS.

†615/31. P. POLYSTACHYUM Wallich. Between Fleet and Crookham, N. Hants, v.-c. 12, plentiful and quite naturalised, Lt.-Col. G. WATTS.

†615/32. P. CUSPIDATUM Sieb. & Zucc. By Aldershot Club, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†628/9. EUPHORBIA VIRGATA W. & K. Greenhithe, Kent; Mitcham, Surrey, H. S. REDGROVE.; Forrester's Drive, S. Beddington, Surrey, A. L. STILL.

628/11. E. CYPARISSIAS L. Abundant at Elm's Vale near Dover, JOHN JACOB.

628/13. E. PORTLANDICA L. A maritime form of *E. segetalis* L. Lulworth Cove, Dorset, v.-c. 9, Miss P. A. LEAKE.

*†635/1. CANNABIS SATIVA L. (*fide* A. R. Horwood, who saw my three specimens of my Ref. No. 4885 and James Sinclair's specimen of his Ref. No. 968 at the Royal Herbarium, Kew, on 21st November 1933).—Ref. No. 4885, carrot plot in a vegetable garden, 160 feet above mean sea-level, Whiteglen House, Hoy, Orkney, 27th September 1933, H. H. JOHNSTON. Not native. A single ♂ plant, near the Hayling Ferry, Portsea Island, S. Hants, v.-c. 11, Hon. W. J. L. PALMER.

*646/1. QUERCUS ROBUR L. The common species in N. Lancs is *Q. sessiliflora*, but there is a good specimen of *Q. Robur* near the western shore of L. Windermere, N. of the Ferry Hotel, v.-c. 69b, Dr W. H. PEARSALL.

*646/4. Q. ILEX L. Wood near Flagstone Hill, Weston-super-Mare, North Somerset, v.-c. 6, CHAS. WATERFALL, det. A. B. JACKSON.

650/3. ×SALIX UNDULATA Ehrh. (S. ALBA × TRIANDRA). Ditchlands, Berrow, N. Somerset, 1933, SANDWITH, det. FRASER.

650/3. S. ALBA L. × FRAGILIS L., f. MONSTROSA Floderus. Roadside, Warwickwold, Bletchingley, Surrey, v.-c. 17, J. E. LOUSLEY.

650/3. S. ALBA L. × PENTANDRA L. (S. EHRHARTIANA Sm.). Near Bordeaux Farm, Little Chesterford, North Essex, v.-c. 19, J. E. LOUSLEY and A. W. GRAVESON.

650/10. S. ATROCINEREA Brot. × AURITA L. Hedgerow in lane between Worm's Heath and Chelsham, Surrey, v.-c. 17, J. E. LOUSLEY.

650/12. S. NIGRICANS Sm. × PHYLICIFOLIA L. By Lawers Burn; on island at mouth of Dochart, Loch Tay; Stob Garbh, Ben Lui, Mid Perth, all v.-c. 88, J. E. LOUSLEY.

650/14. S. ARBUSCULA L. × HERBACEA L. (× S. SIMULATRIX F. B. White). Rocks at head of Allt Innischoarach, Mid Perth, v.-c. 88, J. E. LOUSLEY.

650/17. S. MYRSINITES L., var. PROCUMBENS (Forbes). Rocks at head of Allt Innischoarach, Mid Perth, v.-c. 88, J. E. LOUSLEY.

651/1. POPULUS CANESCENS Sm. × TREMULA L. (P. HYRIDA M. Bieb.). Corston, N. Somerset, 1932, SANDWITH.

651/3c. P. NIGRA L., var. VIRIDIS Lindley, ♂. Nailsea, N. Somerset, 1932, SANDWITH, det. FRASER.

*652/1(2). EMPETRUM HERMAPHRODITUM Hag. Glen Doll, Angus. G. TAYLOR, comm. R. H. CORSTORPHINE.

653/2. CERATOPHYLLUM DEMERSUM L. *In boat-house at Wray Castle, Lake Windermere, v.-c. 69b, Dr W. H. PEARSALL; in pond at Staplehurst, Kent, fruiting on 12th August 1933, H. D. STANLEY; *Balloch Pond, Crieff, Mid Perth, v.-c. 88, R. MACKECHNIE. [*C. aquaticum* is recorded for v.-c. 88 in *Top. Bot.*, Supp. 1].

*654/1. HYDROCHARIS MORSUS-RANAE L. Ditches of Fleet Pond, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

661/1. CORALLORRHIZA TRIFIDA Chât. Near Auchmore, Killin, Mid Perth, v.-c. 88, E. C. WALLACE.

*665/1. GOODYERA REPENS (L.) R. Br. In *Rep. B.E.C.*, 110, 1932, this is recorded for Stuston Common, near Diss, E. Norfolk. Stuston Common is in E. Suffolk, v.-c. 25. According to the *Comital Flora*, this is a new vice-county for *Goodyera*, E. MILNE-REDHEAD.

*667/1. Cephalanthera rubra Rich. "Near Trowbridge, Wilts, v.-c. 8, T. Gardner, June 1906," ex Herb. J. B. Duncan.

668/2. Epipactis latifolia Allioni. Waterworks wood, Matfield, Kent. First fully open flowers, 18th July 1933, W. H. Pearsall.

668/3. E. leptochila Godfr. *Woods in East Sussex some miles south of Tunbridge Wells, v.-c. 14, W. H. Pearsall and Col. A. H. Wolley-Dod; *Nonington, E. Kent, v.-c. 15, John Jacob.

668/5. E. rubiginosa Crantz. (=E. atrorubens Schultes). Seen by several members on limestone scars near Settle, Yorks, v.-c. 64, in July.

*669/10. Orchis elodes Gris. Henfield Common, W. Sussex, v.-c. 13, E. C. Wallace.

699/11. O. Fuchsii Druce. North Leigh, district 5, Oxon, v.-c. 23, spike 5 in., stem 27 in. = 32 in., with several other equally fine spikes. Sent to Kew, 3rd July 1933, W. D. Campbell and H. W. Powell.

674/6. Platanthera chlorantha Reichb. *Castle Coch Woods, June 1900, and Rhubina, both Glamorganshire, Miss E. Vachell, teste P. M. Hall. N.C.R. for v.-c. 41. *Moorland near Burnley, v.-c. 59, W. Mumberson and A. Turner.

674/7. P. bifolia Reichb. Grwney Valley, Glamorganshire, v.-c. 41, June 1912, E. & C. T. Vachell, teste P. M. Hall.

669/18. Himantoglossum hircinum Koch. (= Orchis hircina Crantz). Stonesfield, the Isis district, Oxon, v.-c. 23, W. D. Campbell, per H. W. Powell. Found by Winnie Gatford, taken by her to Mr Campbell, science master, Charlbury Central School, who visited the habitat. Specimen sent to Kew, 30th June 1933. First record for district 5 (Isis).

678/2. Crocus vernus (L.) All. Holywater, N. Hants, v.-c. 12, Hon. W. J. L. Palmer and P. M. Hall; *in the middle of a meadow, blooming fully, 3rd March 1934, in an exposed situation, East Burham, Bucks, v.-c. 24, E. B. Basden.

686/2. Leucojum aestivum L. Between Twyford and Loddon Bridge, Berks, abundant, H. S. Redgrove.

707/1. Ornithogalum pyrenaicum L. Growing as a weed—one plant only—by the side of a bed of onions in the garden of Mr Henry Ward, signalman, Railway Cottages, Goathland, N.E. Yorks, v.-c. 62, introduced, R. J. Flintoff.

707/2. O. umbellatum L. *Near Lee Place by Wey and Arun Canal, near Billingshurst, W. Sussex, v.-c. 13, E. C. Wallace; in flower, 21st May 1933, Tunbridge Wells Common, v.-c. 16, E. D. MORGAN; Holywater, N. Hants, v.-c. 12, Hon. W. J. L. PALMER and P. M. HALL.

*708/1. LILIUM MARTAGON L. Stourport Woods near Worcester, v.-c. 37, 1901, J. B. DUNCAN.

711/1. GAGEA LUTEA Ker. Abundant at one place between Cold Ashton and Doddington, Gloster, H. S. REDGROVE.

*713/1. COLCHICUM AUTUMNALE L. Near Braunton, N. Devon, v.-c. 4, Dr F. R. E. WRIGHT.

718/2. JUNCUS ACUTUS L. Par, E. Cornwall, v.-c. 2, Miss E. S. TODD.

718/7. J. FILIFORMIS L. Shores of Bassenthwaite Lake, a new station for v.-c. 70. This species has been seen in recent years on the shores of Coniston, Esthwaite, Crummock, Buttermere and Derwentwater, Dr W. H. PEARSALL and Dr W. A. SLEDGE.

718/8. J. SUBNODULOSUS Schrank. Clarkston, Renfrew, v.-c. 76, August 1933, recorded in *Top. Bot.* but not in *Com. Fl.*, R. MACKECHNIE; Isle of Oxholme, N. Lincoln, v.-c. 54, Dr H. B. W. SMITH.

718/11. J. ALPINUS Villars. [Error]. Glamorgan, v.-c. 41. *T.B.* Supp. 1. "Glamorgan," Vachell sp., recorded by Mr A. Bennett. *Rep. B.E.C.*, 394, 1913, corrected by Dr Druce to 2436, *J. alpinus* Vill. Near Cromer, Norfolk, E. Vachell. "The record for Glamorgan in Bennett's *Add. to Top. Bot.* is a mistake for Norfolk. Mr Bennett identified the plant as *alpinus*, but I have not seen the specimen." *Rep. B.E.C.*, 284, 1930, line 12, "In first Suppl. to *Top. Bot.* Bennett gives:—41. Glamorgan [error, should be 27. E. Norfolk], Vachell. Ditto, line 5. Vol. iv, B.E.C., "Near Cromer, Norfolk, E. Vachell, named by A. Bennett who (in *Top. Bot.* Add.) erroneously put the record to Glamorgan." Mr Bennett's Herb. still contains this specimen. Mr A. J. Wilmott definitely states that it should be recorded as *J. alpinus* Vill., error. It was recorded in Riddelsdell's *Flora of Glamorgan* and Trow's *Flora of Glamorgan*.

718/14. J. COMPRESSUS Jacq. [Error.] Glamorgan, v.-c. 41, in *T.B.*, Supp. 2. No locality given. This record is apparently based on a specimen sent by E. Vachell to Mr A. Bennett for verification, 15th August 1902. He remarks, "The other (rush) seems to be *J. compressus* but that is hardly ripe enough to be positive. E. Vachell thinks it likely that the specimen was gathered near Cromer, Norfolk, and not in Glamorgan, but cannot remember. No other records for this species exist, and it seems wise to consider the record an *error*.

718/14. J. COMPRESSUS Jacq. Hornsea Mere, S.E. Yorks, v.-c. 61, R. BULLEY; edge of pond, Bampton, Oxon, P. G. BEAK.

718/16. J. MACER S. F. Gray. *Glasgow, Lanark, v.-c. 77; *Clauchlands, Arran, v.-c. 100, R. MACKECHNIE.

718/16. J. TENUIS Willd. Ponaanooth, Cornwall, Miss E. S. TODD.

*†719/9. LUZULA ALBIDA DC. Grange-in-Borrowdale, v.-c. 70, Mrs L. C. KENNEDY.

722/2. SPARGANIUM RAMOSUM Curt. Patterton, Renfrew, v.-c. 76. R. MACKECHNIE.

735/2. TRIGLOCHIN PALUSTRE L. Sea-shore, Holy Island, v.-c. 68. E. C. WALLACE.

737/4. POTAMOGETON COLORATUS Vahl ex Hornem. In quantity at Braunton, N. Devon, v.-c. 4, W. H. PEARSALL.

737/5. P. ALPINUS Balb. Castle Howard, N.E. York, v.-c. 62, Miss C. ROB; Loch of Craigleash, Perth; burn from Loch Ussie, E. Ross; Lintrathen Reservoir, Angus, G. TAYLOR.

737/9f. P. GRAMINEUS L., var. LACUSTRIS Fries. Loch of Lowes, New Cumnock, Ayrshire; also from Glenbuck, Ayrshire, the form known as *P. paucifolius* Opiz, G. TAYLOR.

737/11. ×P. NITENS Weber, var. SUBGRAMINEUS (Raunkiær) Hagstr. Burn from Loch Ussie, E. Ross, v.-c. 106. Var. SUBPERFOLIATUS, f. LACUUM Hagstr. Lochindorb, Elgin, v.-c. 95. Var. SUBINTERMEDIUS Hagstr. Marlee Loch, Perth, and Coldingham Loch, Berwickshire; *Loch Lubnaig, W. Perth, v.-c. 87, G. TAYLOR. The Oxford List should be amended as follows:—e. *subgramineus* (Raunk.) Hagstr. f. *subintermedius* Hagstr. g. *subperfoliatus* (Raunk.) Hagstr.

737/12. P. ANGUSTIFOLIUS Bercht. et Presl. Mepal, Cambridgeshire, v.-c. 29, Miss E. VACHELL; abundant and with mature fruits in Cauldshiels Loch, v.-c. 79, N. DOUGLAS SIMPSON.

737/13. P. LUCENS L., type, and var. LONGIFOLIUS DC. Plentiful in ditches at Mepal, Cambridgeshire, v.-c. 29, Miss E. VACHELL; type in Loch-na-craige, Mid Perth, v.-c. 88, G. TAYLOR.

737/14. P. DECIPIENS Nolte. Ditches at Mepal, Cambridgeshire, v.-c. 29, Miss E. VACHELL. All the records given in the *Comital Flora* for this species need revision as they include var. *salicifolius* Ar. Benn. (*L.C.*, 1925, 1954d) which is a form of *P. nitens*.

*737/14e. ×P. DECIPIENS Nolte, var. BREVIFOLIUS Hagstr. In the R. Tweed below Coldstream Bridge, Cheviotland, v.-c. 68, E. C. WALLACE; *near Coldstream, v.-c. 68, E. C. WALLACE.

737/15. P. PRAELONGUS Wulf. Loch-na-craige, Mid Perth, v.-c. 88; Lochindorb, Elgin, v.-c. 95, G. TAYLOR.

737/16. P. PERFOLIATUS L., var. OVATIFOLIUS Wallr. Loch Clunie, E. Perth, G. TAYLOR. Var. ROTUNDIFOLIUS Wallr. Marlee Loch, E. Perth, G. TAYLOR.

737/17. P. CRISPUS L. Loch Clunie, E. Perth; Glenbuck, Ayrshire, G. TAYLOR.

737/19. P. ACUTIFOLIUS Link. Pond near R. Ouse, below Barcombe Mills, E. Sussex. See under "Plant Notes" for *P. zosterifolius*, 737/18, W. H. PEARSALL.

737/20. P. OBTUSIFOLIUS M. & K. Loch Clunie and Marlee Loch, E. Perth; Lintrathen Reservoir, Angus; Faldonside Loch, Selkirk; Loch of Lowes, New Cumnock, Ayr, G. TAYLOR.

737/21. P. PUSILLUS L., subsp. LACUSTRIS Pears. This has been seen during the past year in Windermere, Coniston, Esthwaite, Derwentwater, Bassenthwaite and Ullswater, Dr W. H. PEARSALL.

*737/22. P. FRIESII Rupr. Canal at Cardiff, Glamorgan, v.-c. 41, E. VACHELL, teste PEARSALL.

737/23. P. PUSILLUS L. Fleet Pond, N. Hants. v.-c. 12, G. WATTS; Loch Clunie, E. Perth; burn from Loch Ussie, E. Ross; Lintrathen Reservoir, Angus; Faldonside Loch, Selkirk, G. TAYLOR.

737/23. P. PUSILLUS L. Ditches in Easton Marsh, Freshwater, I. of Wight, v.-c. 10, Dr W. A. SLEDGE and P. M. HALL, det. PEARSALL.

*737/25. P. PANORMITANUS Biv.-Bern. Small lake at Llangammarch, Brecon, Wales, v.-c. 42, Lady DAVY; Fleet Pond, N. Hants, v.-c. 12, G. WATTS; marsh ditches near Lewes, E. Sussex, v.-c. 14, E. C. WALLACE.

737/28. P. PECTINATUS L. Eaglesham, Renfrew, v.-c. 76, R. MACKECHNIE.

738/2. RUPPIA ROSTELLATA Koch. Eaststoke, Hayling, S. Hants, v.-c. 11; Prinstead, W. Sussex, v.-c. 13, P. M. HALL.

739/1. ZANNICHELLIA PALUSTRIS L., var. GENUINA A. & G. Fishboure Millpond, W. Sussex, v.-c. 13, P. M. HALL, det. PEARSALL; Faldonside Loch, Selkirk, v.-c. 79, G. TAYLOR.

*739/2. Z. PEDICELLATA Fries, var. PEDUNCULATA (Reich.) Farlington Marshes, S. Hants, v.-c. 11, Dr W. A. SLEDGE and P. M. HALL, det. PEARSALL.

740/2. Zostera nana Roth. Prinstead, W. Sussex, v.-c. 13, P. M. Hall, det. Pearsall.

741/1. Cyperus longus L. Well established in wet field near Hever, W. Kent, v.-c. 16, E. C. Wallace.

745/2. Eleocharis uniglumis Schultes. Marsh by the sea, Llanmaddea, Glam., v.-c. 41, 1933, Sandwith; marsh near S. Haven. Studland Heath, near Swanage, Dorset, A. L. Still.

746/2c. Scirpus maritimus L., var. monostachys Meyer. Dawlish Warren, S. Devon, Francis M. Day.

746/4. Scirpus Tabernaemontani Gmel. Near Newdigate, Surrey, v.-c. 17, A. L. Still.

*746/8. S. pauciflorus Lightf. Moor above Braunton. N. Devon, v.-c. 4, removes this exception in the *Com. Fl.*, W. H. Pearsall and Dr F. R. E. Wright; Berrow, N. Somerset, v.-c. 6, H. S. Redgrove.

746/10. S. Holoschoenus L. Braunton Burrows in great beauty and abundance, W. H. Pearsall and Dr F. R. E. Wright.

746/12. S. filiformis Savi. (S. Savii Seb. & Maur.). Braunton Burrows, W. H. Pearsall and Dr F. R. E. Wright.

746/14. S. compressus Pers. Holy Island, N. Northumberland, v.-c. 68, E. C. Wallace.

746/14. S. compressus Pers. (Blysmus compressus Panz.). Near Andoversford, E. Gloster, v.-c. 33, Miss L. Abell.

746/14. Blysmus compressus Panz. Burnham-on-Sea, Somerset. H. S. Redgrove.

*750/1. Cladium Mariscus R. Br. Near Braunton, N. Devon. v.-c. 4, W. H. Pearsall and Dr F. R. E. Wright.

*753/2. Carex riparia Curtis. Blyton, N. Lincoln, v.-c. 54, Dr H. B. Willoughby Smith.

753/2b. C. riparia Curt., var. gracilis Coss. & Germ. Canal bank. Dogmersfield. N. Hants, v.-c. 12, Lt.-Col. G. Watts.

753/3. C. acutiformis Ehrh. Blyton, N. Lincoln, v.-c. 54, Dr. H. B. Willoughby Smith; *common in Low Furness, N. Lancs, v.-c. 69b, W. H. Pearsall; *abundant in N. Devon, v.-c. 4, W. H. Pearsall and Dr F. R. E. Wright.

*753/8. C. lasiocarpa Ehrh. Near Braunton, N. Devon, v.-c. 4, W. H. Pearsall and Dr F. R. E. Wright.

753/12. C. STRIGOSA Huds. Wood, E. of Haslemere, Surrey, J. G. LAWN; Duke's Wood, Newdigate, Surrey, A. L. STILL.

753/12. C. STRIGOSA Huds. News Wood, Eastnor, Herefordshire, a new station, F. M. DAY.

753/15. C. BINERVIS Sm. Marshy field near Bampton, Oxon, P. G. BEAK.

753/19. C. HOSTIANA DC. (C. FULVA Host). Bog at Cothill, Berks, v.-c. 22, P. G. BEAK.

*753/22. C. OEDERI Retz. Braunton Burrows, N. Devon, v.-c. 4, W. H. PEARSALL and Dr F. R. E. WRIGHT.

753/24. C. DEPAUPERATA Curt. Plentiful at one spot near Cheddar, N. Somerset, specimens sent to Kew Hbm., H. S. REDGROVE.

753/27. C. HUMILIS Leysser. Pentridge Hill, Dorset; Bokerley Ditch, Dorset and S. Hants; Martin Down, Blagdon Hill, Windmill Hill Tidpit and Cran's Barrow, S. Hants; Wich Down, S. Wilts, P. M. HALL. This is a considerable extension of the plant's range in Dorset and Hants as previously recorded, and links up the known stations.

753/30. C. MONTANA L. Near Charterhouse, Somerset, very abundant, H. S. REDGROVE.

753/39. C. RARIFLORA Sm. Carnan Tuire, Glen Callater, S. Aberdeen, v.-c. 92, very fine, 8 in.-9 in. high, 9th July 1933, R. MACKECHNIE.

753/49. C. GOODENOWII Gay, f. PUMILA Kük. Castle Morton Common, Worcestershire, FRANCIS M. DAY.

753/57. C. AXILLARIS Good. (C. REMOTA × VULPINA). Between Dawes Green and Betchworth, Surrey, A. L. STILL.

753/58. C. CANESCENS L. Blyton, N. Lincoln, v.-c. 54, Dr H. B. WILLOUGHBY SMITH.

753/63. C. BOENNINGHAUSENIANA Weihe. (C. PANICULATA × REMOTA). Alder swamp on Reigate Heath—probably the locality given by Salmon, *Fl. Surrey*, 1931, 628—nine clumps were observed, A. L. STILL.

753/75. C. DIOICA L. Colony bog, Bisley, Surrey, v.-c. 17, E. C. WALLACE.

*754/11. PANICUM LINEARE Krocker. (P. HUMIFUSUM Kunth. P. GLABRUM Gaud. DIGITARIA HUMIFUSA Pers.). Seen *in situ* by W. D. Miller, W. H. Pearsall and Dr F. R. E. Wright near Braunton, N. Devon, on September 6th, 1933, and considered by them undoubtedly native.

†756/2. SETARIA VIRIDIS Beauv. (PANICUM VIRIDE L.). Near Lewes, Sussex, v.-c. 14, Miss K. PICKARD.

764/1. LEERSIA ORYZOIDES (L.) Sw. Near Lyndhurst, S. Hants. v.-c. 11, with panicle nearly exserted on 3rd September 1933, Dr W. A. SLEDGE and P. M. HALL.

770/6. ALOPECURUS FULVUS Smith. Dunsfold, Surrey. Unrecorded for this district (Xb) in the *Flora of Surrey*, p. 637, Hon. Mr JUSTICE TALBOT.

†777/6. PHLEUM GRAECUM Boiss. et Heldr. Tip, Bristol, v.-c. 34, 1933, SANDWITH, det. HUBBARD.

†780/3f. AGROSTIS NIGRA With. Near Cardiff, Glamorgan, v.-c. 41, 1933, E. VACHELL.

*780/4. A. SETACEA Curt. Abundant on Halsinger Down above Braunton, N. Devon, at 500 ft. Not given for v.-c. 4 in *Comital Flora*. W. H. PEARSALL and Dr F. R. E. WRIGHT.

782/1. POLYPOGON MONSPELIENSIS Desf., also the hybrid ×POLYPOGON LITTORALIS Sm. Allhallows-on-Sea, West Kent, v.-c. 16. With both putative parents by a brackish ditch. Mr H. S. Redgrove, whom I directed to the station a month later, states that he has made arrangements with the owners of the estate to protect the ditch in which this beautiful grass grows, J. E. LOUSLEY.

*783/2. CALAMAGROSTIS LANCEOLATA Roth. Near Elstead, Surrey, v.-c. 17. This was given in the last Report without the star. A new county record for Surrey, G. M. ASH.

791/4b. DESCHAMPSIA FLEXUOSA Trin., var. MONTANA Hook. fil. Carn an Tuire, S. Aberdeen, v.-c. 92; Ben Douran, Argyll, v.-c. 98, R. MACKECHNIE and E. C. WALLACE.

*795/2. ARRHENATHERUM TUBEROSUM Gilib. Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

797/1. CYNODON DACTYLON Pers. Woodcote Avenue, Wallington. Surrey, growing in an ash-path and apparently enjoying it, A. L. STILL.

802/1d. PHRAGMITES COMMUNIS Trin., var. FLAVESCENS Custer. Kynance, Cornwall, v.-c. 1, Miss E. S. TODD.

809/3. KOELERIA BRITANNICA (Domin). Forge Valley, near Scarborough, v.-c. 62, J. CHAPPLE.

*814/1. CATABROSA AQUATICA Beauv. Occurs in N. Devon. v.-c. 4. Dr F. R. E. WRIGHT; Waggoner's Wells, Grayshott, Hants, v.-c. 12. New to district X of Townsend's *Flora*, J. E. LOUSLEY.

*824/5. POA PALUSTRIS L. Margin of Fleet Pond. Hants, v.-c. 12, J. E. LOUSLEY.

*824/13. P. BULBOSA L. Hayling Island, S. Hants, v.-c. 11, in small quantity and badly threatened by car parking, 1932, C. STALEY, and 1933, P. M. HALL.

826/4. FESTUCA LOLIACEA Curt. Walton Bridge, Middlesex, A. L. STILL.

827/17. BROMUS COMMUTATUS Schrad. Brent Knoll, Cornwall, Miss E. S. TODD.

*827/20. BROMUS MOLLIFORMIS Lloyd. S. Stack, Holyhead, Anglesey, v.-c. 52, J. E. LOUSLEY.

*†835/7. HORDEUM JUBATUM L. (*fide* C. E. Hubbard, who saw my four specimens of my Ref. No. 4882 and James Sinclair's specimen of his Ref. No. 967 at the Royal Herbarium, Kew, on 20th November 1923). —Ref. No. 4882, grassy, gravelly, waste ground near a wooden poultry-house, 160 feet above mean sea-level, Hamar House. Stromness. Orkney, 22nd September 1933, H. H. JOHNSTON. Not native. Seeds of this species introduced with poultry food into Orkney. One tuft of plants, in flower and withered flower (no fruit developed), only seen. A new record for this alien species for v.-c. 111, discovered by James Sinclair, junior, in my company, on 22nd September 1933, when he collected his specimen of his Ref. No. 967.

839/2. JUNIPERUS SIBIRICA Burgsd. On Moel Meirch, the boundary between Carnarvon and Merioneth, N. WOODHEAD.

854/4. POLYSTICHUM LONCHITES Roth. Blackshope, Moffat, Dumfries, v.-c. 72, July 1898, J. B. DUNCAN. In *Top. Bot.*, Supp. 1, but not in *Com. Flora.*

856/11. PHEGOPTERIS ROBERTIANA Braun. Very abundant at Cheddar, v.-c. 6, H. S. REDGROVE.

859/1. CETERACH OFFICINARUM Willd. Though rare elsewhere in N. Lancs it is abundant on the walls of Wray Castle, Lake Windermere, Dr W. H. PEARSALL; Funtingdon, W. Sussex, v.-c. 13, P. M. HALL.

863/1. HYMENOPHYLLUM TUNBRIDGENSE Sm. Near East Grinstead, Sussex, v.-c. 14; v.s.s., W. J. L. PALMER.

866/1. OPHIOGLOSSUM VULGATUM L. Barry Links, Angus, v.-c. 90, 3rd July 1929, R. MACKECHNIE. Queried for v.-c. 90 in *Top. Bot.* and *Comital Flora.* In Gardiner's *Flora of Forfarshire* there is a note to the effect that Don recorded this plant from Barry, but that the record had never been confirmed. The *Flora* is dated 1848. The doubt of its occurrence in Angus can now be removed. Mr Mackechnie has sent Mr E. C. Wallace excellent specimens.

†868/1. Azolla filiculoides Lam. Mudeford, S. Hants, v.-c. 11, J. W. Long.

876/12. Chara aspera Willd. Cauldshiels Loch, near Galashiels, v.-c. 79, N. Douglas Simpson.

876/16. C. fragilis Desv. Fleet Pond, N. Hants, v.-c. 12, G. Watts.

New County Records ex "Journal of Botany," 1933.

45/2. Cochlearia officinalis L. Lundy Island, N. Devon, v.-c. 4, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 2. Add to *C.F.*, but not N.C.R., vide *T.B.*, ed. ii, p. 35.

*54/6. Brassica Cheiranthus Vill. Lundy Island, N. Devon, v.-c. 4, native, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 2.

*103/9. Sagina Reuteri Boiss. Lundy Island, N. Devon, v.-c. 4, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 3. Confirmed by W. H. Pearsall. First record on granite.

*†110/1. Tamarix gallica L. Lundy Island, N. Devon, v.-c. 4, planted, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 3.

*†275/1. Archangelica officinalis Hoffm., teste Kew. Lundy Island, N. Devon, v.-c. 4, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 5.

*†378/5. Artemisia Stelleriana Bess. Weston Mouth, S. Devon, v.-c. 3, a single plant, August 25th, 1932, F. Druce, *J.B.*, xxxi, 76, 1933; Hengistbury Head, S. Hants, v.-c. 11, September 1900, H. W. Pugsley, *J.B.*, xxxi, 107, 1933.

*457/5. Limonium binervosum C. E. Salmon. Alderney, A. B. & A. K. Jackson, *J.B.*, xxxi, 107, 1933. *C.F.* does not mention S.

*618/10. Rumex rupestris Le Gall. Kenfig, Glamorgan, v.-c. 41, Miss E. M. Thomas, vide Gilmour, *J.B.*, xxxi, 16, 1933.

*633/2. Ulmus nitens Moench. Alderney, A. B. & A. K. Jackson, *J.B.*, xxxi, 107, 1933.

*753/72. Carex pauciflora Lightf. Bog near Stonethwaite, Cumberland, v.-c. 70, July 1931, W. R. Philipson, *J.B.*, xxxi, 76, 1933.

*790/1. Weingaertneria canescens (L.) Bernh. Near Lossiemouth, Moray, v.-c. 95, E. H. Chater, *J.B.*, xxxi, 15, 1933.

*795/2. Arrhenatherum tuberosum Gilib. Lundy Island, N. Devon, v.-c. 4, Dr F. R. Elliston Wright, *J.B.*, xxxi, Supp., p. 10.

FURTHER CORRECTIONS AND ADDITIONS TO PREVIOUS REPORTS.

PATRICK M. HALL.

REP. B.E.C. FOR 1927, VOL. VIII, PART III.

p. 305. For 189/26 read 189/23(2), and for *Vilmorinciana* read *Vilmoriniana.*

p. 319. 717(2)/1. Add var. *viridis* to *List* as var. b.

REP. B.E.C. FOR 1928, VOL. VIII, PART V.

p. 617. For 341/5 read 341/6, and add to *List.*

p. 618. 396/8. For *purpureocaulis* read *purpureocaule.*

p. 625. For 423/62(2) read 423/62(3) *T. hemipolyodon.*
For 423/62(3) read 423/62(2) *T. hamiferum.*

Note.—It is clearly intended in the *List* that the Taraxaca shall be arranged, as far as possible, alphabetically.

p. 626. 423/67. Delete all this paragraph, which is duplicated, *l.c.*, p. 629.

p. 633. 543/19. For *Garckiana* Fourn. read *Garkiana* P. Fourn., vide *l.c.*, p. 881.

p. 635. For 600/8(3) read 600/8.

p. 747. For 474/2 read 474/3, and add to *List.*

p. 880. Line 33. For 15(2) read 15(3), vide *l.c.*, p. 621.
Line 34. For 15(3) read 15(2), vide *l.c.*, p. 620.
Line 44. For 63(2) read 62(2), vide correction to *l.c.*, p. 625, above.
Line 45. For 62(2) read 62(3), vide correction to *l.c.*, p. 625, above.
Line 48. For *simulatum* read *similatum*, vide description, *l.c.*, p. 626.

p. 881. Line 41. For *brasiliense* read *brasiliensis.*

p. 883. Line 18. Delete this addition: var. *argillacea* already appears in *List* as var. b.
Line 25. For 9 read 8.
Line 45. For 138 read 137.

REP. B.E.C. FOR 1929, VOL. IX, PART I.

p. 22. 196/1. For *gracilis* read *gracilipes.* The plant described here as var. *gracilis* is clearly the same as that referred to on p. 115 of the same *Report* as var. nov. *gracilipes.* The description on p. 115 is the more detailed and that fact and the use of the expression "var. nov." suggest that of the two names *gracilipes* is the one intended to be given to this variety.
274/1. Add var. *purpurascens* to *List* as var. d.

p. 30. 446/7. Add var. *parviflora* to *List* as var. e.
For 509/7 read 509/6.

p. 31. 515/10. For Visiani read Viviani.

p. 38. 688/1. Add var. *trilobata* to *List* as var. b.

p. 124. For 423/88 read 423/35.

REP. B.E.C. FOR 1930, VOL. IX, PART III.

p. 260. 185/30(2). For Marss. read Maass.

p 263. For 194/7 *R. squarrosa* Rau read 194/12 *R. Afzeliana* Fr.
194/12. Var. *Bartlettiana* will be var. o. in the *List*.
Var. *berniciensis* will be var. p. in the *List*.
194/19. For *dimorpha* Dum. read *dimorpha* (Bess.) Déség., vide Wolley-Dod, *Revision of British Roses*, p. 89.

p. 271. 419/125(4). Var. *multiflorum* will be var. b. in the *List*, with the name of the species in square brackets.

p. 278. 545/19. Var. *minoriflora* will be var. d. in the *List*, var. e. is *obscura* Pugsl.

p. 371. 669/18. Delete Morestead.
For Whitchurch, S. Hants, read Whitchurch, N. Hants.
For Owlesbury read Morestead.

REP. B.E.C. FOR 1931, VOL. IX, PART V.

p. 572. For 735/5 read 737/5.

p 751. Under *G. Tetrahit* L., for var. *arvensis* Schleich. read Schlecht.

REP. B.E.C. FOR 1932, VOL. X, PART I.

p. 21. 35/4 d. For *palustris* read *palustre*.

p. 30. For 718/d. read 718/.

p. 91. For 84/4 e. read 88/4 e.

p. 92. 133/3. The asterisk should be affixed to both records.

p. 104. 383/7. Add * N.C.R. for Stafford, v.-c. 39.

p. 109. 611/7. For S. Hants read W. Sussex.
618/3. ×*obtusifolius* = × *acutus*. Add * N.C.R. for Stirling, v.-c. 86.

p. 110. 623/2. Remove brackets from v.-c. 38 in *C.F.*

p. 115. 783/2. Remove brackets from v.-c. 17 in *C.F.*

p. 115-116. 826/7. Add var. *genuina* to *List* as var. a.
Add var. *vulgaris* to *List* as var. a(2).
826/7 e. The names *pruinosa* (Hack.) and *glaucescens* Heg. & Heer. are apparently not synonymous, as they are made in the *List*.

p. 116. 826/3. Add var. *orientalis* to *List* as var. d.

p. 122. Line 32. For 79 read 91.

p. 130. Line 36. For 341/5 read 341/6, see correction to *Rep. B.E.C.*, 1928, 617, above.

	Line 44.	Delete this note and read " correct name to *acinodontum*, vide p. 880, *loc. cit.*
p. 131.	Line 1.	Delete this note.
p. 134.	Line 36.	For 62(3) read 62(2), see correction to *Rep. B.E.C.*, 1928, 880, above.
p. 135.	Line 42.	For *gracilis* read *gracilipes*, see correction to *Rep. B.E.C.*, 1929, 22, above.
p. 137.	Line 43.	Delete this note and substitute " for 428/88 read 423/35."
p. 141.	Line 35.	For 194/7 read 194/12, and for var. q. read var. o., see correction to *Rep. B.E.C.*, 1930, 263, above.
	Line 36.	For var. o. read var. p., see correction to *Rep. B.E.C.*, 1930, 263, above.
p. 142.	Line 43.	For var. c. read var. d., see correction to *Rep. B.E.C.*, 1930, 278, above.
p. 146.	Lines 20 to 24.	See corrections to *Rep. B.E.C.*, 1930, 371, above.
p. 161.	Line 13.	For var. r. read var. q. For var. s. read var. r.
p. 162.	Line 16.	For *tomentosa* read *suberecta*.
p. 163.	Line 18.	For 668/3 c. read 668/3 b. *E. dunensis* Godf. will be 668/3(2) in the *List*.
p. 164.	88/31.	Delete this note, already recorded in *C.F.*
	190/18.	For " brackets " read " query."
	194/10.	Delete words " delete brackets from v.-c. 85," and add * for N.C.R.
	304/2.	Delete this note, already recorded in *Rep. B.E.C.*, 1929, 118.
p. 165.	753/12.	Delete this note, already recorded in *Rep. B.E.C.*, 1929, 142.
	753/55.	Delete * and add " delete brackets from v.-c. 90 in *C.F.*"
p. 246.	Line 18.	Add var. *bulbifer* to *List* as var. a.
p. 247.	Line 4.	Delete ? from var. g. *valdepubens* in *List*.
	Line 9.	For " corn " read " corm."
p. 248.	Line 1.	Add var. *macrorhizus* to *List* as var. h.
pp. 249 seq.		Add *Valeriana angustifolia* Host to *List* as 301/1(2).
p. 251.	In second line of footnote,	for *dentifolia* read *dentatifolia*.
p. 370.	Line 9.	Add *S. arenaria* L. to *List* as 650/11(2).
p. 392.	Line 9.	Add var. *radicans* to *List* as 506/4 b.
p. 397.	Line 31.	Add var. *tomentosa* to *List* as 184/11 a.

COMITAL FLORA OF THE BRITISH ISLES.

ADDENDA AND CORRIGENDA.

EDGAR THURSTON.

CORNWALL.

[ ] indicates that the plant is doubtfully native—*e.g.*, on ballast heaps or in harbours.

4/1. *Adonis annua* L. Add [2].
6/21. *R. circinatus* Sibth. "1-3." Not known in 2.
19/1. *N. lutea* L. Add [2]. Introduced into pond on Goss Moor.
21/4. *P. Lecoqii* Lam. Add 1 and 2.
32/1. *F. capreolata* L. Add 2.
32/11. *F. micrantha* Lag. Add 1.
32/13. *F. parviflora* Lamk. Add 1: [2].
35/3. *R. amphibia* (L.) Dr. (*Nasturtium amphibium* Br.). Add 1.
36/4. *B. arcuata* Rchb. Add 2.
44/1. *E. verna* Meyer. Add 1 and 2.
49/5. *S. Irio* L. Add [1 and 2].
54/15. *B. alba* Boiss. Add 2.
54/22. *B. incana* (*B. adpressa* Boiss.). Add [2].
61/2. *L. latifolium* L. Add [1].
61/3. *L. Draba* L. Add 1, if not already added.
64/2. *T. perfoliatum* L. Add [1].
68/1. *I. tinctoria* L. Add 68 to the genus, [1] to the species.
92/2. *D. deltoides* L. Add [1].
96/3. *S. conica* L. Add [2].
96/4. *S. noctiflora* L. Add 2.
100/7. *C. pumilum* Curt. "1." Recorded, apparently by mistake, in *Top. Bot.*, 1873, p. 94, from "Corn. West. C.C.B. (Babington), 1839" (Davey, *Flora of Cornwall*).
112/13. *H. Desetangsii* Lam. Add [1].
112/16. *H. linariifolium* Vahl. Disappeared long ago from Cape Cornwall, v.-c. 1. The plant recorded from Budock, v.-c. 1, is possibly a narrow-leaved form of *H. perforatum* which is plentiful in the neighbourhood.
116/2. *L. sylvestris* Brot. Should be 1, Scillies. Also recorded (as *L. cretica* L.) from several localities on the mainland.
127/6. *G. Endressi* Gay. (Recorded in error as *G. nodosum* in Davey, *Flora of Cornwall*).
127/7. *G. pyrenaicum* Burm. f. Add 1.
142/2. *A. campestre* L. Add 1 and 2.
151/3. *O. spinosa* L. Add 2.
153/2. *M. sylvestris* Fr. Add [1].

155/18. *T. suffocatum* L. Re 2, Briggs doubted the accuracy of the record from near Crafthole.

166/1. *A. glycyphyllos* L. Add 1.

176/36. *V. gracilis* Lois. Add 2.

178/9. *L. Aphaca* L. Add [1 and 2].

257/1. *M. Odorata* Scop. Add [1]. Tresco, Scilly Isles.

261/3. *C. Cerefolium* (*Anthriscus Cerefolium* Hoffm.). Add [1], Scilly Isles and several localities on the mainland.

283/8. *C. latifolia* L. Add 1.

296/12. *G. spurium* L., var. *Vaillantii* DC. Add 1. Specimens in Marlborough College Hbm. from Sennen Cove, Druce thought they were this.

301/1. *V. officinalis* L. Add 1.

328/3. *G. sylvaticum* L. Add 2.

367/1. *D. maritima* Cass. Add 2. Par sands, 1915; still there.

368/1. *A. tinctoria* L. Add [2].

378/5. *A. Stelleriana* Bess. For Penzance, read sandy coast, Marazion, abundant.

383/7. *S. squalidus* L. Add [1 and 2].

383/8. *S. viscosus* L. Add [2].

393/1. *A. Lappa* L. Add 1.

397/1. *O. Acanthium* L. Add [2].

405/15. *C. calcitrapa* L. Add [2].

415/2. *P. Hieracioides* L. Add 2.

419/2. *H. Peleterianum* Mérat. Add 1.

446/4. *E. ciliaris* hybridises with *E. Tetralix* in West Cornwall.

462/1. *C. hederifolium* Ait. Add [2]. Naturalised in a wood by Ready-money Bay, Fowey.

486/1. *P. caeruleum* L. Add [2].

506/1. *M. palustris* Hill. Add 1.

527/6. *V. pulverulentum* Vill. Add [2]. With the hybrid *V. pulverulentum* × *nigrum*, near ballast heaps, Charlestown.

527/7. *V. Lychnitis* L. Add [2]. Also the hybrid *V. Lychnitis* × *nigrum*, Par harbour.

532/4. *L. Pelisseriana* Mill. For [1] read [2].

532/5. *L. supina* Desf. Add [1], Railway line, Penzance, spreading: [2], Par harbour, with the hybrid *L. repens* × *supina* = *cornubiensis* Druce. For St Blayey's read Blazey.

537/1. *M. guttatus* DC. Add 2.

543/17. *V. triphyllos* L. Alter genus number to 543. Add [2].

548/5. *R. stenophyllus* (Schur) Druce. Add 2.

550/4. *O. major* L. Add 1 and 2.

561/6. *T. lanuginosus* Mill. Add 2.

562/8. *Calamintha Acinos* Clairv. Add 1, Scilly Isles and several places on the mainland.

600/5. *C. urbicum* L. Add 2.

606/2. *A. littoralis* L. Add 1 and 2.

618/7. *R. sanguineus* L. Druce suggested that the records for this in *Fl. Cornwall* require overhauling.
625/1. *H. Rhamnoides* L. Add [2].
628/10. *E. Esula* L. Add [1].
628/16. *E. Lathyris* L. Add 1 and 2.
669/5. *O. Morio* L. Add 1 and 2.
669/11. *O. Fuchsii* Dr. Add 1.
674/6. *H. virescens* (*Platanthera chlorantha* Rchb.). Add 1.
679/1. *R. Columnae* Seb. & Maur. 2. Not seen at Polruan for many years.
680/1. *S. angustifolium* Mill. Add [2].
702/9. *A. oleraceum* L. Add [1].
702/11. *A. Schoenoprasum* L. Add 2.
703/1. *M. racemosum* Lam. & DC. Add [1 and 2].
718/14. *J. compressus* Jacq. Add 1, Scilly Isles and several localities on the mainland.
718/16. *J. macer* S. F. Gray. Add 1.
723/1. *A. italicum* Mill. Add 2.
727/4. *L. gibba* L. Add 1.
739/2. *Z. pedunculata* Reichb. Add 1.
745/2. *E. uniglumis* Sch. Add 1, Scilly Isles, teste Bennett. See Davey, *Flora of Cornwall*.
753/1. *C. Pseudo-cyperus* L. Add 2.
753/34. *C. pallescens* L. Add 1.
753/68. *C. divisa* Huds. Add 2.
754/11. *P. Ischaemum* Schreb. (*P. lineare* Krocker). Add [1].
765/1. *P. minor* Retz. Add [1].
778/1. *M. minima* (L.) Desv. Add [2].
780/1. *A. verticillata* Vill. Add [1 and 2].
782/1. *P. monspeliensis* (L.) Desf. Add 2.
785/1. *A. Spica-venti* (L.) Beauv. Add [2].
797/1. *C. Dactylon* Pers. Add [2].
809/3. *K. britannica* (Domin as sub-sp.). Add 2. (Alter sp. No. to 3).
818/1. *M. nutans* L. Add 1 and 2.
824/5. *P. palustris* L. Add [2].
827/1. *B. rigens* L. Add [2].
827/22. *B. arvensis* L. Add 1 and 2.
828/2. *B. pinnatum* (L.) Beauv. Not known to me in 1. Add [2].
830/2. *A. pungens* R. & S. Add 2.
830/6. *A. caninum* Beauv. Add 2.
835/3. *H. marinum* Huds. Add [1 and 2].
836/1. *E. arenarius* L. Add 2.
872/7. *N. gracilis* Ag. Add 2.
876/2. *C. canescens* Lois. Add 1, Swanpool, Falmouth: Lizard peninsula. Not known to me in 2.
876/5. *C. hispida* L. Not known to me in 2.

A FEW GENERAL ADDITIONS AND CORRECTIONS TO COMITAL FLORA.

PATRICK M. HALL.

1. *Clematis.* For [Tourn.] L. read [Dill.] L.

32/5. *Fumaria Boraei* Jord. Add 68 (Wallace).

37/4. *Arabis alpina* L. For 104 in heavy type read Scot. 1. 104.

176/35. *Vicia tetrasperma* (L.) Moench. For *tetraserpma* read *tetrasperma.*

190/6(2). *Alchemilla heteropoda* Buser. Alter specific number to 4(2).

217/6. *Callitriche autumnalis* L. Add 76 (Wallace).

250/2. *Carum verticillatum* Koch. Add 9 !

405/9. *Centaurea nemoralis* Jord. Alter specific number to 11.

542. *Veronica.* Alter generic number to 543.

545/1. *Euphrasia officinalis* L. In penultimate line of this section, for *brevifolia* read *brevipila.*

560. *Origanum.* Add generic number 560.

561/1. *Thymus Pulegioides* L. and

561/2. *Thymus glaber* Mill. According to the re-arrangement of "Rep. B.E.C.," 1928, 663, these should be amalgamated under *T. Pulegioides.*

664/1. *Spiranthes aestivalis* (Lam.) Rich. Add 37 extinct.

664/3. *S. Romanzoffiana* Cham. Delete brackets from Scot. 1 and read 1. 104.

753/21. *Carex lepidocarpa* Tausch is printed out of order, after 753/22.

825/2(2). *Glyceria declinata* Breb. Alter specific number to 3(2).

826/14. *Festuca sulcata* Hack. Specific number should be 9e.

ADD TO LISTED SPECIES.

876/15. *Chara fragifera* Durieu.

876/16. *C. fragilis* Desv.

876/17. *C. delicatula* Ag.

ADDITIONS AND CORRECTIONS TO COMITAL FLORA FOR HAMPSHIRE AND THE ISLE OF WIGHT.

Vice-Counties 10, 11 and 12.

PATRICK M. HALL.

Note.—The prefix * indicates an introduced or alien species. Brackets ( ) indicate erroneous or doubtful records requiring confirmation.

2/3. *Thalictrum marinum* Dr. Delete 12; must be an error.
6/10. *Ranunculus sardous* Cr. Bracket 12; one very old record only.
6/12. *R. ophioglossifolius* Vill. Bracket 11; extinct if not originally an error.
6/22. *R. trichophyllus* Chaix. Add 12.
9/1. *Helleborus viridis* L., var. *occidentalis* (Reut.) Dr. Remove brackets from 10.
13/3. *Delphinium Ajacis* L. Add *11.
22/1. *Meconopsis cambrica* (L.) Vig. Add *12.
32/1. *Fumaria capreolata* L. Add (11).
32/9. *F. Bastardi* Bor. Add 10.
32/13. *F. parvifolia* Lam. Add 10 as var. *acuminata*.
33/1. *Matthiola incana* Br. Add *11.
35/2. *Radicula sylvestris* (L.) Dr. Add 10.
39/3. *Cardamine impatiens* L. Add (11).
39/6. *C. bulbifera* Crantz. Delete 11; an error probably derived from "Top. Bot. Supp." 2. Specific number should be 7 instead of 6.
43/4. *Draba muralis* L. Add *11.
44/3. *Erophila praecox* (Stevens) DC. Add 12.
49/2. *Sisymbrium Sophia* L. Add *11.
49/5. *S. Irio* L. Add *10; extinct.
54/5. *Brassica monensis* Huds. Delete (11); the plant was recorded (correctly) as *Cheiranthos* and not as *monensis*.
61/2. *Lepidium latifolium* L. Add *11.
61/3. *L. Draba* L. Add *10 and *12.
61/4. *L. ruderale* L. Add *10.
65/1. *Iberis amara* L. Add *11; *Note.*—10 is bracketed and 12 is not; I do not see that in the case of weeds of cultivation there is any point in trying to distinguish between native and introduced stations.
68/1. *Isatis tinctoria* L. Add generic number 68. Add *10, *11 and *12.
88/10. *Viola calcarea* (Bab.) Greg. Add 10.
88/14. *V. contempta* Jord. Add 11.
88/15. *V. variata* Jord. Add 12.

88/17. *V. monticola* Jord. Add 12.
88/18. *V. alpestris* Jord. Add 12.
88/19. *V. Lejeunei* Jord. Add 10.
88/20. *V. Lloydii* Jord. Add 12.
88/23. *V. segetalis* Jord. Add 12.
88/30. *V. derelicta* Jord. Add 10.
89/5. *Polygala calcareum* F. Schultz. Add 10.
92/2. *Dianthus Deltoides* L. Add *11; 12 should also be *.
93/1. *Tunica prolifera* (L.) Scop. Extinct in 10.
96/3. *Silene conica* L. Add *11; 12 should also be *.
96/6. *S. quinquevulnera* L. Add *11.
96/10. *S. nutans* and *S. dubia* Herbich. The distribution of these two plants needs to be entirely revised as it has been shown that what was formerly called *dubia* is the true *nutans* L., and what was called *nutans* is now known as var. *Smithiana* Moss.
S. nutans L. occurs in 10 and 11.
Smithiana does not occur.
103/9. *Sagina Reuteri* Boiss. Add 10.
105/2. *Spergularia media* (Pers.) Presl. For 9, 11 read 9-11; the total distribution is given correctly as 64, but the numbers as printed add up to 63.
110/1. *Tamarix gallica* L. Delete (12).
116/1. *Lavatera arborea* L. Remove brackets from 10.
123/3. *Tilia cordata* Mill. Add 12.
127/1. *Geranium sanguineum* L. Add *10; 11 should also be *.
127/11. *G rotundifolium* L. Add (12).
127/15. *G. purpureum* Vill. Add 11.
128/1. *Erodium maritimum* L'Hérit. Add (12).
128/2. *E. moschatum* L'Hérit. Bracket 10; doubtful.
133/1. *Impatiens Noli-tangere* L. 11 should be *, certainly introduced. Add *12.
133/3. *I. parvifolia* DC. Add *11.
151/1. *Ononis reclinata* L. Add (11).
153/1. *Medicago Falcata* L. Add *10.
153/2. *M. sylvestris* Fries. Add *10.
153/6. *M. minima* (L.) Desr. Add (11).
155/5. *Trifolium Molinerii* Balb. Add *11.
155/19. *T. agrarium* L. Add *12.
160/6. *Lotus tenuis* W. & K. Add 12.
176/1. *Vicia sylvatica* L. Add (*11); doubtful, in any case adventive.
176/9. *V. lutea* L. Add *11.
176/14. *V. Lathyroides* L. Add (12); one old record only.
178/4. *Lathyrus maritimus* Bigel. Add 10; extinct.
178/5. *L. palustris* L. 10 and 11 both extinct.
178/9. *L. Aphaca* L. Add 10.
189/6. *Potentilla verna* L. Add 12, probably *.
190/1. *Alchemilla pubescens* Lam. Add (11).

190/4. *A. minor* Huds. Add 11.

193/2. *Poterium polygamum* W. & K. Add 10 and 11.

193/4. *P. officinale* (L.) A. Gray. Add 12.

194/5. *Rosa stylosa* Desv. Add 10 and 12.

194/18. *R. obtusifolia* Desv. Add 10, 11 and 12.

194/19. *R. tomentosa* Sm. Add 10 and 11.

194/21. *R. villosa* L. Add (10), (11) and 12.

195/9. *Pyrus intermedia* Ehrh. Add 11 and 12.

195/16. *P. germanica* Hook. fil. Add *11; now lost.

196/2. *Crataegus oxyacanthoides* Thuill. Add 11 and 12.

205/1. *Parnassia palustris* L. Add 10, extinct.

209/1. *Tillaea muscosa* L. Add 12.

211/2. *Sedum rupestre* L. Add *11.

213/1. *Drosera anglica* Huds. Add (12), very doubtful; recorded in Rayner's "Supplement" as var. *ramosa*.

217/3. *Callitriche palustris* L. Add 12.

220/6. *Epilobium Lamyi* F. Schultz. Add 11 and 12.

220/8. *E. roseum* Schreber. Add 10.

223/3. *Oenothera odorata* Jacq. Add *11.

225/2. *Circaea canadensis* Hill. Add *11.

239/1. *Eryngium campestre* L. Add 12; well established but probably adventive.

244/1. *Smyrnium Olusatrum* L. Add 12.

250/1. *Carum Carvi* L. Add *10 and *11.

250/5. *C. Bulbocastanum* (L.) Koch. Delete (11 error); the record was for 12. Add *12.

253/1. *Sium latifolium* L. Add 12.

265/5. *Oenanthe silaifolia* Bieb. Add (11); a very old record, never confirmed but in a situation where the plant might well occur.

283/8. *Caucalis latifolia* L. Add *10 and *11.

290/1. *Linnaea borealis* L. Bracket 11, doubtless error; there is one old record and in Townsend's "Flora" it is suggested that there was confusion with *Wahlenbergia*; confusion with *Anagallis tenella* is more probable.

296/3. *Galium erectum* Huds. Bracket 12; queried in Townsend and never confirmed.

301/1. *Valeriana officinalis* L. Add (10).

304/4. *Valerianella carinata* Lois. Add 11 and 12.

320/3. *Erigeron canadense* L. Add 10.

324/4. *Filago gallica* L. Add 11.

333/1. *Inula Helenium* L. Add *12.

378/5. *Artemisia Stelleriana* Bess. Add *11.

380/3. *Petasites fragrans* Presl. Add *12.

381/1. *Doronicum Pardalianches* L. Add *12.

381/2. *D. plantagineum* L. Add *11.

383/1. *Senecio sarracenicus* L. Add *12.

383/4. *S. erraticus* Bert. Add 10.

383/8. *S. viscosus* L. Add 10, 11 and 12.

395/3. *Carduus pycnocephalus* L., var. *tenuiflorus* (Curt.). Delete 12; it is recorded in 2nd ed. "Top. Bot." without personal authority and apparently nowhere else.

405/8. *Centaurea nigra* L. (*obscura* Jord.). Add 11 and 12.

416/9. *Crepis foetida* L. Add (11).

419/8. *Hieracium aurantiacum* L. Add *12.

425/2. *Lactuca Serriola* L. Add 10 and 11.

435/2. *Campanula latifolia* L. For (11) read (12).

446/7. *Erica vagans* L. Add *11 and *12.

457/5. *Limonium binervosum* C.E.S. Add (10); an old record, needs confirmation.

458/3. *Statice planifolia* (Syme) Dr. Add 10.

466/1. *Glaux maritima* L. Add 10.

478/4. *Centaurium pulchellum* (Sw.) Dr. Add (12).

480/6. *Gentiana lingulata* Ag., var. *praecox* Towns. Add 11.

497/2. *Symphytum tuberosum* L. Add *11 and *12.

509/2. *Echium plantagineum* L. Add *10, *11 and *12.

521/1. *Atropa Belladonna* L. Add 10 and 11.

527/4. *Verbascum virgatum* Stokes. Add *12.

527/6. *V. pulverulentum* Vill. Add *11.

527/7. *V. Lychnitis* L. Add *11 and *12.

532/4. *Linaria Pelisseriana* Mill. Add *12.

535/1. *Scrophularia vernalis* L. Add *11.

537/1. *Mimulus guttatus* DC. Add *10.

546/4. *Bartsia viscosa* L. Add (12); old record, needs conf.

549/2. *Melampyrum arvense* L. Add *11.

550/9. *Orobanche amethystea* Thuill. Delete 10.

552/1. *Utricularia vulgaris* L. Delete 10; add 11.

552/2. *U. major* Schmidel. Add 10.

558/3. *Mentha longifolia* (L.) Huds. Remove brackets from 10.

558/4. *M. spicata* Huds. Add 11.

558/6. *M. piperita* Huds. Add 12.

558/10. *M. gentilis* L. Add 11.

558/11. *M. cardiaca* Baker. Add 11.

561/6. *Thymus lanuginosus* Mill. Add 12.

561/8. *T. Drucei* Ronn. Add 10.

562/4. *Satureia sylvatica* (Bromf.) Dr. Bracket 12.

562/7. *S. Nepeta* (L.) Scheele. Add (11) and (12).

566/1. *Salvia pratensis* L. 11 should be *.

573/2. *Prunella laciniata* L. Add 10.

577/2. *Stachys germanica* L. Add *10.

577/4. *S. ambigua* Sm. Add 11.

578/1. *Galeopsis speciosa* Mill. Add 11 and 12.

587/4. *Ajuga Chamaepitys* (L.) Schreber. Add 11.

600/12. *Chenopodium ficifolium* Sm. Add *10.

612/1. *Suaeda fruticosa* Forsk. Delete 10; 11 extinct.

615/15. *Polygonum minus* Huds. Add 10, 11 and 12.

618/10. *Rumex rupestris* Le Gall. Delete 11; the only record seems to be that in "Top. Bot."

618/13. *R. maritimus* L. Add 10 and 12.

626/1. *Viscum album* L. Remove brackets from 10.

628/9. *Euphorbia virgata* W. & K. Add *10 and *12.

628/12. *E. Paralias* L. Delete 12.

628/17. *E. Peplis* L. 10 extinct.

637/3. *Urtica pilulifera* L. For (12) read (11).

651/3. *Populus nigra* L. Add *10, *11 and *12.

653/2. *Ceratophyllum demersum* L. Add 12.

654/1. *Hydrocharis Morsus-ranae* L. Add 12.

659/1. *Malaxis paludosa* (L.) Sw. Add (10); an error, given with ? in "Top. Bot."

664/4. *Spiranthes aestivalis* (Lam.) Rich. Read S. before Hampshire.

668/3. *Helleborine leptochila* (Godf.) Dr. Add 11 and 12.

668/4. *H. purpurata* (Sm.) Dr. Delete 10; an error derived from "Top. Bot.," where *purpurata* is made, incorrectly, a synonym of *media*, which *has* been recorded from 10.

669/18. *Orchis hircina* (L.) Crantz. Add 10.

671/1. *Aceras anthropophora* (L.) Br. Add 11.

672/2. *Ophrys sphegodes* Mill. Add 11; appears to be extinct in 10 and 12.

674/3. *Habenaria albida* (L.) Br. 11 should be bracketed.

680/1. *Sisyrinchium angustifolium* Mill. Add *11.

684/3. *Narcissus biflorus* Curt. Alter specific number from 2 to 3. Add 10, 11 and 12.

685/1. *Galanthus nivalis* L. Add 10.

702/7. *Allium triquetrum* L. Add *11.

702/11. *A. Schoenoprasum* L. 11 should be *; add *12.

703/1. *Muscari racemosum* Lam. & DC. Delete 11.

706/1. *Scilla verna* L. Add (10); extinct or error.

707/1. *Ornithogalum pyrenaicum* L. 11 should be *; may be native but status at present doubtful.

710/1. *Tulipa sylvestris* L. Add *10 formerly, *11 and *12.

711/1. *Gagea lutea* (L.) Ker-Gawler. Add 11.

713/1. *Colchicum autumnale* L. Add 11.

718/16. *Juncus macer* S. F. Gray. Add *12.

722/2. *Sparganium ramosum* Huds. (segregate). Add 10.

723/1. *Arum italicum* Mill. Remove brackets from 11 and add 12.

737/13. *Potamogeton lucens* L. Add (10), error.

737/27. *P. trichoides* Cham. & Schlecht. Add 12.

737/29. *P. interruptus* Kit. Add 10, 11 and 12.

739/2. *Zannichellia maritima* Nolte. Add 11.

746/9. *Scirpus nanus* Sprengel. Add 11.

746/10. *S. Holoschoenus* L. Add 11 formerly, extinct.

747/4. *Eriophorum vaginatum* L. Bracket 10; error or doubtful.

753/57. ×*Carex axillaris* Good. Add 10 and 11.

753/58. *C. canescens* L. Add 12.
753/61. *C. Pairaei* F. Schultz. Add 10 and 11, as var. *Leersii*.
753/63. ×*C. Boenninghausiana* Weihe. Add 10.
753/67. *C. arenaria* L. Add 12 to inland counties.
754/8. *Panicum Crus-galli* L. Add *10.
754/10. *P. sanguinale* L. Add *10 and *11.
754/11. *P. Ischaemum* Schreber. Add *10.
765/1. *Phalaris minor* Retz. Add *10 and *11.
766/2. *Anthoxanthum aristatum* Boiss. Add *10.
770/6. *Alopecurus aequalis* Sobol. Add 11.
780/3. *Agrostis capillaris* L., var. *nigra* (With.). Add 12.
782/1. *Polypogon monspeliensis* (L.) Desf. Delete "somewhat doubtfully native;" this species is undoubtedly native in salt-marshes in S. Hants and elsewhere in S. England. 10; now extinct as native but occurs as an adventive.
785/1. *Apera Spica-venti* (L.) Beauv. Add *10 and (*11).
797/1. *Capriola Dactylon* (L.) O.K. Add *10 and *11.
808/1. *Cynosurus echinatus* L. Add 10 and 12.
824/5. *Poa palustris* L. Add 11.
824/13. *P. bulbosa* L. Add 11.
826/16. *Festuca ambigua* Le Gall. Add 10.
827/1. *Bromus rigens* L. Add *10.
827/5. *B. madritensis* L. Add *10.
827/19(2). *B. britannicus* Williams. Add 12.
829/3. *Lolium remotum* Schrank. Add *10.
836/1. *Elymus arenarius* L. Add 10.
848/1. *Adiantum Capillus-veneris* L. Add *11.
856/2. *Dryopteris cristata* (L.) A. Gray. Add (10) and (12), both errors.
856/11. *D. Robertiana* (Hoffm.) Christ. Add 12, possibly native.
857/4. *Cystopteris Filix-fragilis* (L.) Bernh. 11 should be *.
868/1. *Azolla Filiculoides* Lam. Add *11 and *12.
Add 876/16. *Chara fragilis* Desv. 10, 11 and 12.
Add 876/17. *C. delicatula* Ag. 10 and 11.

ADDITIONS AND CORRECTIONS TO THE COMITAL FLORA FOR LINCOLNSHIRE.

F. T. BAKER.

V.-c. 53, South Lincolnshire. V.-c. 54, North Lincolnshire.

The numbers are those of the second edition of "The British Plant List."

6/23. Add v.-c. 53.
7/2. Add v.-c. 54.
9/1. Add v.-c.s 53 and 54. Not native.
11/1. Add v.-c. 53. Naturalised.

21/6. Add v.-c. 53.

22/1. Add v.-c. 54. Casual.

32/5. Add v.-c. 53.

32/9. Add v.-c. 54.

39/4. Add v.-c. 53.

44/1. Add v.-c. 53.

44/2. Add v.-c. 54.

49/5. Add v.-c. 53.

52/1. Add v.-c. 53.

60/1. Add v.-c. 53.

61/4. Add v.-c. 53.

88/3. Add v.-c. 53.

88/20. Add v.-c. 53 (det. Dr Drabble). We have *no* record for v.-c. 54.

88/22. Add v.-c. 53 (det. Dr Drabble).

88/26. Add v.-c. 53 (det. Dr Drabble).

88/27. Add v.-c. 53 (det. Dr Drabble). We have *no* record for v.-c. 54.

88/28. Add v.-c. 53 (det. Dr Drabble). We have *no* record for v.-c. 54.

96/3. Add v.-c.s 53 and 54. Casual species.

96/6. Add v.-c. 54. Adventive.

96/10. Add v.-c. 54. Adventive.

101/4. Add v.-c. 54.

112/14. Add v.-c. 53.

116/1. Add v.-c. 54. Casual.

117/4. Add v.-c. 54. Casual.

124/1. Add v.-c. 53.

127/5. Add v.-c. 53. Casual.

149/3. Add v.-c. 53.

154/3. Add v.-c.s 53 and 54.

155/4. Add v.-c.s 53 and 54. Often an escape from cultivation.

166/1. Add v.-c. 53.

170/1. Add v.-c. 53.

173/1. Add v.-c. 53. Adventive.

178/4. Extinct in v.-c. 54.

189/8. Add v.-c. 53.

194/2. Add v.-c.s 53 and 54.

194/21. Add v.-c. 54.

211/3. Add v.-c.s 53 and 54. Escapes.

217/3. Add v.-c.s 53 and 54.

217/5. Add v.-c.s 53 and 54.

220/5. Add v.-c. 53.

220/8. Add v.-c. 54.

276/3. Delete v.-c. 54 in brackets.

291/5. A mistake in Peacock's "Check List of Lincolnshire Plants," where county Division 5 was printed instead of Division 15. Therefore *delete* v.-c. 54, and *add* v.-c. 53.

304/4. Delete v.-c. 53, add v.-c. 54.
368/1. Add v.-c.s 53 and 54. Adventives.
371/3. Add v.-c.s 53 and 54. Now well established in both.
381/1. Add v.-c. 54. Adventive.
383/8. Add v.-c. 54. Adventive.
383/34. Should read 54 *not* 53. Believed to be extinct.
405/7b. Add v.-c. 54.
463/5. Add v.-c. 53.
486/1. Add v.-c.s 53 and 54. Possible escapes.
527/4. Should read v.-c. 54 *not* v.-c. 53.
539/1. Delete v.-c. 54. Probably extinct in v.-c. 53.
543/6. Add v.-c. 53.
550/12. Add v.-c. 54.
600/6. Add v.-c.s 53 and 54.
632/2. Add v.-c. 53.
644/1. Add v.-c.s 53 and 54. Introduced.
651/3. Add v.-c. 54.
653/1. Add v.-c. 54.
669/8. Add v.-c.s 53 and 54.
669/10. Add v.-c. 53.
669/18. Add v.-c. 53.
685/1. Add v.-c.s 53 and 54. A very old introduction.
689/1. Add v.-c.s 53 and 54. Planted.
702/4. Add v.-c. 53.
724/1. Add v.-c. 53.
730/1. Add v.-c.s 53 and 54.
737/18. Add v.-c. 53.
826/18. Add v.-c. 53.
840/1. Add v.-c. 53 and 54. Planted probably in most cases.
841/1. Add v.-c.s 53 and 54. Planted.
851/5. Add v.-c. 53.
872/2. Add v.-c. 54.
876/7. Add v.-c.s 53 and 54.

[To most people the more natural order would appear to be N. 53, S. 54, but all Watsonian divisions give South before North, as in this case—S. Lincs. 53, N. Lincs. 54—and this is probably how many of errors in this and other vice-comital records have arisen.—W.H.P.]

A HOLIDAY IN NORTH DEVON.

I was quite unable to make any arrangements about holidays this year until the 1932 Report was "off the stocks," so that when my copy arrived late in August I was still undecided as to locality. However, a most kind and opportune invitation from Dr F. R. E. Wright received about the same time settled the matter at once in favour of Braunton, N. Devon, which I reached on September 1. I was already steeped in information bearing on the botany of the district for I had been compelled only a few months previously to read the MS. and proofs of Dr Wright's paper in the 1932 Report and had, moreover, thoroughly enjoyed his arresting little book on Braunton reviewed on p. 47 of the same Report. I was therefore more than ordinarily interested in my first visit to this district.

My first reaction was to the exceptional abundance and beauty of several of my favourite species, seldom seen in such profusion elsewhere—the beautiful bright blue *Cichorium Intybus*; the massed yellow heads of *Inula Conyza*; the pale reddish-purple flowers of *Eupatorium cannabinum* with their very long deeply-cloven white styles, and the waving silky plumes of *Phragmites*. Later I was very greatly impressed by the famous Braunton Burrows through which I was conducted on several occasions by my friend, Dr Wright. The compactness of this sand-dune area—roughly three miles long by one mile broad—is in strong contrast to somewhat similar areas in Cumberland, where the sand-hills run along the coast for some twenty miles and afford space for the trial of long range naval guns. The vegetation, too, is in Devon much more varied and interesting. My first "thrill" was the sight of huge tufts of *Scirpus Holoschoenus*—some taller than myself—which is very abundant and occurs as a native only here and in one small patch in Somerset. It is also rare and adventive in Glamorgan. The late W. D. Miller told me that he had taken seeds hence and scattered them plentifully near the Somerset habitat but none germinated. Almost equally imposing were the tufts of *Carex acutiformis* which were among the finest I've seen.

"Roughly speaking, the Burrows may be divided into two parts: the Western, consisting of large hills chiefly clothed with Marram Grass (*Ammophila arenaria*), and the inner Eastern portions of small hills and plains. On the level areas where water does not stand in winter, one walks on a crisp grey lichen almost everywhere. This is the Reindeer Moss (*Cladonia rangiferina*). In the plains where water has stood during the winter, the little Shoreweed (*Littorella lacustris*) grows, and is easily mistaken for Buckshorn Plantain. Other minute flowers which through their modest size may pass unnoticed are the little white star-like blossoms of the Knotted Pearlwort (*Sagina nodosa*) and the Cathartic Flax (*Linum catharticum*), usually growing together. The sweet pink flowers of the Bog Pimpernel (*Anagallis tenella*) produce sheets of colour which can be seen from a distance. Among the better Labiates the White Horehound (*Marrubium vulgare*), the Black Horehound (*Ballota nigra*), and the Cat Mint (*Nepeta Cataria*) are common. The rare Water Germander (*Teucrium Scordium*) grows in great abundance, its pale purple flower being one large lip. In bud the middle lobe of the lip bends upward, forming a complete protective dome over the anthers and opening to the flowers before they are mature. The anthers mature before the style, and are at first placed well in front, so as to come in contact with visiting insects. Later they are curled back over the calyx, and the style bends down and comes into the position previously held by the anthers to receive pollen of these visitors brought from other plants. The whole plant is covered with grey downy hairs which form a great protection against loss of moisture, for although the plant grows in moist places, the Burrows in summer may become very dry. The Yellow Bartsia (*Bartsia viscosa*) is common on the Eastern side. The short hair which covers it is sticky and prevents small insects climbing up the stem and biting through the calyx or corolla to rob the honey without fertilising the flower. Usually small dead insects may be seen sticking on the stem, but these are not the only thieves who go in by the back door—bees are known to bite through the calyx of some Campions, which they find less trouble than in reaching the nectaries by the proper route. Plants which are robbed in this way are thought to date back to a time when that particular type of robber was not present in their district. Some of the Campions have large inflated calyces. The enlarged calyx is thought to be an attempt at protection against such robbery."

In such an environment I expected to find Henbane (*Hyoscyamus niger*) but was unable to discover a plant. I was informed that it used to be common but has now almost disappeared. In Lancashire and Cumberland its most noteworthy character is the intermittent nature of its appearances. You find a promising colony of plants one year but none in the same place for several successive years, in each of which you may with diligent search find it at a distance.

" Both in the Burrows, as well as in the Marshes, we see great numbers of Horsetails (Equisetums). These throw up in the early part of the year light brown-coloured fruiting shoots which may be mistaken for another plant altogether, being so different in appearance from the green summer sterile shoots. These Horsetails are very ancient plants, which are plentifully represented in the fossils of the Carboniferous Period. Now the surface of the earth before this period must have been mainly composed of Silica, the early rocks being chiefly composed of Quartz, Mica and Felspar (all containing mostly Silica). The present-day Horsetails are very rich in silicious particles. When their vegetable substance is destroyed by maceration it is possible to produce complete silicious skeletons of these plants, maintaining their erect form. The ash of Horsetails contains half its weight of Silica.

They are useless as fodder, and are even avoided by cattle, but they have a great local reputation here for fattening horses, being locally known as ' tidy pipe.'

The Horsetails have, like the Ferns, in their life history what is known as an alternation of generations, the spore of the Horsetail developing into a separate plant form known as a prothallium, a structure like a thin green foliage leaf growing on the surface of the ground. These prothallia are of two kinds, one producing male elements, the other female. After fertilisation of the female elements of the prothallia they can develop into Horsetails again. The spores of the Horsetail have four long filaments, which when dry are spread out and act as wings, enabling the spores to be carried by the wind for dispersion. Usually several are tangled together by these filaments and blow away together, for if one travelled singly, remembering that each produces only one sex, if it landed alone it could never reproduce. Now these spores require a damp place for germination. The filaments are very hygroscopic (sensitive to wet) and falling on a suitable spot the action of dampness causes the filaments to coil tightly round the spore like a ball so that it blows away no more."

I was much too late for the Orchids but saw abundant evidence of the Marsh Helleborine. For a fascinating and finely figured account of this I must refer the reader to Dr Wright's "Braunton" (pp. 26-29), published by A. E. Barnes, 107 High Street, Barnstaple. Herein will be found also full lists of the flora and fauna of the Burrows.

Among plants not recorded for North Devon in the *Comital Flora* were the following species: *Carex acutiformis*, *C. Oederi*, *C. lasiocarpa*, *Cladium Mariscus*, *Catabrosa aquatica*, *Colchicum autumnale*, *Scirpus pauciflorus*, *Agrostis setacea*, and *Mentha Pulegium*—see list of New County and other Records.

Along the Burrows there is already one fine golf course but we were very perturbed to see another in course of construction, with the inevitable removal of hundreds of square yards of native turf and the suggested planting of *Hippophae Rhamnoides*. The area is so unique in being the habitat of many of the rarest species of our flora and fauna that the danger of their extinction is imminent. This Society is keenly interested in the preservation of our native flora and is represented on The Wild Plant Conservation Board. The following extract from the minutes of the Board's Meeting on November 14th, 1933, will be read with great interest by our members:—

"The question of the development now taking place at Braunton Burrows, Devon, was brought to the notice of the Board, and it was pointed out that the area is the home of some of the rarest plants, insects and animals in England. It was resolved that the following be forwarded to the National Trust and the Society for the Promotion of Nature Reserves.

"That in the opinion of the Wild Plant Conservation Board the Braunton Burrows is especially notable for rare birds, wild flowers and insect life, and the Board suggests therefore that every effort should be made to preserve the whole of the Burrows if possible as a Nature reserve."

Professor E. J. Salisbury has always taken an interest in the Burrows and I gladly acknowledge the value of his kindly offices in connection with the above resolution.

In the nature of things my visit was too late in the year for appreciating the full glory of the flowering season but I saw enough of the vestigial traces of spikes and stems to enable me to imagine what a brave show the flowers must have made. Not only were the Burrows so impressive but the surrounding district is of exceptional interest—Baggy Point to the north; the saltmarshes to the south, and the rolling downs rising behind Braunton to the east—all afforded evidence that Nature had been lavish in her gifts.

The pleasant memories of such a delightful holiday will long remain. I am one of those who consider that the social side is one of the most attractive features of Botany—even as a hobby—and to go out with two or three botanists who know their plants is a sheer joy. The late Mr W. D. Miller was a conspicuous example of the ideal companion for such an excursion and as he was staying in Braunton for his health he was induced to accompany us one afternoon to the Burrows. Dr Wright took us by car to see *Panicum lineare*, in which we were all greatly interested. Although obviously extremely weak poor Miller appeared to be greatly pleased by his outing and we hoped for the best, but, alas, it was not to be—only two months later we received the sad news of his passing.

W. H. P.

A FEW ADDITIONS TO THE FLORA OF NORTHAMPTONSHIRE.

(*IN MEMORIAM—GEORGE CLARIDGE DRUCE*).

EDMUND B. BISHOP.

Circumstances, connected chiefly with the health of my sister, impelled us to spend many weeks of the summers of both 1932 and 1933 at a farm in Northamptonshire, instead (as in the past) of exploring those favoured parts of our native land more noteworthy, both from the points of view of the botanist and of the lover of natural beauty.

If, by such enforced sacrifice of long-anticipated hopes, we have lost much, there have been most wonderful compensations. It just happened that our intimate association with the native county of Dr Druce almost immediately followed upon the passing from us of that loved and revered friend. In the quiet lanes and fields of Northamptonshire, again and again we have felt in communion with his spirit. Every bush of *Rosa Rothschildii* has recalled at once his vivid and kindly personality. Also it has just happened, by no conscious choice of ours, that the village which became our temporary home was actually adjacent to the birthplace of John Clare, the peasant-poet and nature-worshipper, whose poems had so great a fascination for Druce, as is evidenced on page after page of his *Flora of Northamptonshire*.

It has been our practice in any new neighbourhood, in addition to exhaustive collecting, to make notes of plants seen, other than those most common. Naturally, we followed this practice here, and accumulated a quantity of notes. Gradually it dawned upon us that these notes might be of service in filling up a few gaps in the *Flora of Northamptonshire*, and possibly be of interest to some members of our Society, especially those to whom the memory of Druce is still dear. Above all, we feel that the publication of these notes would not have been unwelcome to Druce himself, all too inadequate a tribute to him as they are.

The small corner of Northamptonshire specially worked by us is in the extreme north of that county, in the area between the rivers Welland and Nene, when they begin to flow roughly parallel towards the Wash. This part is known as the " Soke of Peterborough," and has a separate County Council from that which governs by far the greater portion of Northamptonshire. We could not work even a tithe of the diminutive Soke, and were unable to get into the fenland proper, but made odd visits beyond, now and then into Lincolnshire and Rutland.

Bainton, our headquarters, is a pleasant thinly-peopled village, of only 140 inhabitants, about five miles from Stamford and ten from Peterborough, just a mile south of the boundary of Lincolnshire. Most of our collecting and observing was made to the south of Bainton, on the (usually) easy slopes of those low oolitic hills, seldom rising much above 200 feet, which form the watershed between Welland and Nene. Although the Soke now possesses no actual open commons (so far as I know) there is much rough uncultivated pasture, and a considerable acreage of fine woodland. Self-advertised " hikers " would probably be looked upon with coldness at least, and any crowd, even of decent ramblers, regarded with some suspicion. But two quiet unassuming old folk such as ourselves—who lay claim with pride to the possession of " country manners," and always shut gates after us—never met with other than true courtesy and most kindly welcome, even when technically trespassing. Indeed, our most profitable hunting grounds were usually those glorious hedges, broad and dense, often obviously untrimmed for many years, which border the large fields so characteristic of that neighbourhood.

Another feature thereabouts, none too common in the South of England, is very dear to our hearts, and must be specially mentioned. No botanist, nor any other decent human being, could help loving those wide grassy " verges," frequently bush-strewn, which add so much charm and elbow-room to almost every lane (and even high road) in the district. It is a country-side of quiet beauty, still largely unspoiled, retaining much of the old-time fragrance of the true England, before petrol and its attendant horrors were permitted to defile our most precious heritage.

With reference to the following list of species and localities, a few explanatory details are necessary.

In general, the arrangement, nomenclature and methods adopted in the *Flora of Northamptonshire* have been followed. New localities have been added, other than those already mentioned by Druce, in the case of every species or variety found by us, except of those quite common. Many of such may appear of trifling value, but I have tried to act as I think Druce himself would have done in the circumstances. An exception has been made of the genus *Rosa*, as will be seen. Here I have acted as a disciple of Col. Wolley-Dod, and have adopted the arrangement and nomenclature of his " Revision of the British Roses."

In every case where a plant was found by my sister, Mrs C. L. Wilde, the name of the locality is followed by " *W*." In two or three instances the names of friends who have made finds have been set out. All other records are my own.

Whenever " Ashton " is mentioned in these notes, the reference is to the hamlet in Bainton parish (Div. 4), not to that near Oundle (Div. 7). From the context at times, I am rather afraid that Druce occasionally confused these two, but cannot attempt to disentangle them.

In certain other instances where Divisions 4 and 7 are concerned, again I fear that a few of Druce's localities have got into the wrong Division, but here also I must leave them.

Re " Helpstone Heath," often given in *Flora of Northamptonshire* as a locality, I am not clear as to where this is (or was) situated, but have an uneasy feeling that it may be one and the same as my " Ailsworth Heath." The latter name is that which appears upon the 6-inch Ordnance Map, and is shown as being in Ailsworth parish, therefore it has been so cited by me.

"Upton Heath" is but our own name for the more or less open, rough heathy fields, adjacent to each other, in the parish of Upton. Much of our time was spent there, and many of our most interesting plants were discovered on this favourite spot.

As more distant—and more famous—haunts of Flora are now beyond our ken, we hope in 1934 to re-visit some of the places mentioned in these notes, and if possible to get further afield.

In the meantime, often in memory we are on a gentle upland, under a spacious heavenly dome of a full hemisphere, not often seen on land, though familiar to those who roam the sea. In every direction, melting away into a very distant horizon, is an extensive peaceful landscape, dotted with seemingly innumerable church spires and towers, the works of Nature and of man, from our viewpoint, for a brief while almost in harmony.

Nearer, and more intimate, is the mental vision of "the wind in the willows," as seen from the farmhouse of our ever-kindly host and hostess. Are there anywhere such entirely lovable trees as those waving white willows of Bainton? Almost worth missing glorious tramps over fell and crag to have been privileged to greet them. Almost worth breaking solemn tryst with blushing *Rosa mollis* in fairy-haunted Allendale to have known them. *Almost.*

Clematis Vitalba L.	4.—Ufford Quarries, *W.*
Thalictrum flavum L.	4.—Bainton, *W.*
Ranunculus repens L.	4.—A double-flowered form at Ufford, *W.*
,, *auricomus* L.	4.—Ashton, *W.* 7.—Wittering, *W.*
,, *peltatus* Schrank	7.—Upton Heath.
(Not recorded in *Fl. Northamptonshire.* Probably overlooked.)	
Caltha palustris L.	
Var. *Guerangerii* (Bor.)	7.—Wittering Marsh.
Castalia alba (L.) Link	4.—Lolham Bridges, *W.*
Papaver Rhoeas L.	
Var. *Pryorii* Druce	4.—Ashton. Bainton. 7.—Barnack. Wittering, *W.*
P. hybridum L.	7.—Southorp, *W.*
(Not recorded in *Fl. Northamptonshire*, but is given for v.-c. 32 in *Comital Flora.*)	
Radicula Nasturtium Dr.	
Var. *siifolia* (Reichb.)	4.—Bainton.
Sisymbrium altissimum L.	4.—Bainton Ballast Pits, *W.*
Lepidium densiflorum Schrad. (Probably.)	4.—Bainton Ballast Pits, *Mrs R. Dallas.*
,, *Draba* L.	4.—Bainton Ballast Pits, *W.*
Thlaspi arvense L.	4.—Bainton Ballast Pits, *W.*
Saponaria officinalis L.	4.—Bainton Ballast Pits, *W.*
Silene angustifolia S. & T.	
Var. *pubescens* (DC.)	4.—Ufford (frequent).
S. noctiflora L.	4.—Barnack. 7.—Wittering, *W.*
Lychnis dioica L.	4.—Bainton, *W.* Wakerley, *W.*
(Very rare, only found twice.)	
L. Githago Scop.	7.—Walcot.
Sagina apetala Ard.	4.—Burghley Park wall, near Stamford.

Geranium pratense L.	4.—In glorious profusion by the east edge of Wakerley Wood. Already recorded from here, but the sight was too lovely to be passed by without mention.
G. pusillum L.	4.—Burghley Park, *W.*
G. lucidum L.	4.—Ufford, *W.*
Ilex Aquifolium L.	(Nowhere seen in a wild situation. The entire absence of this familiar tree from the most likely heaths and woods was very strange to us.)
Rhamnus Frangula L.	7.—Ailsworth Heath. (Several bushes growing with *R. catharticus.* The latter is common throughout the greater part of our area, but only in this one situation did we find *R. Frangula.*)
Genista tinctoria L.	4.—Ashton, *W.* Ufford.
Cytisus scoparius (L.) Link	7.—Southey Wood, Ufford.
Ononis repens L.	4.—Bainton.
O. spinosa L.	4.—Barnack.
Melilotus altissima Thuill.	4.—Bainton Ballast Pits, *W.*
M. alba Desr.	4.—Bainton Ballast Pits, *Mrs R. Dallas.*
M. indica (L.) All.	4.—Bainton Ballast Pits, *W.*
Trifolium fragiferum L.	4.—Bainton, *W.*
T. procumbens L.	4.—Bainton, *W.*
T. filiforme L.	7.—Upton Heath.
Astragalus glycyphyllos L.	4.—Ufford, *W.* 7.—Upton, *W.* Near Sutton Heath.
A. danicus Retz.	4.—Ufford, *W.*
Vicia tetrasperma (L.) Moench	7.—Ailsworth Heath.
Prunus Avium L.	4.—Ufford.
P. spinosa L. Var. *macrocarpa* Wallr.	4.—Ufford.
Spiraea Filipendula L.	4.—Ashton, *W.* 7.—Ailsworth, *W.* Upton, *W.*
Fragaria vesca L. Var. *leucocarpa* Dr.	7.—Walcot, *W.* (Common in one restricted spot.)
Alchemilla minor Huds.	7.—Southey Wood, Ufford. *W.* Ailsworth Heath. *W.*
Agrimonia Eupatoria L.	7.—Ailsworth road, *W.* (A large plant making some approach towards *A. odorata*, perhaps var. *umbrosa* Coss. & Germ.)
Poterium polygamum W. & K.	4.—Ufford, *W.* Easton-on-the-Hill, *W.*

Rosa (Tourn.) L.

Probably more attention was paid to this genus than to all the other genera combined, many thousands of rose bushes having been examined by us. In connection with this genus I have followed the arrangement and nomenclature of Lt.-Col. A. H. Wolley-Dod, as set out in his "Revision of the British Roses." Also, in every case where a Rose is new to v.-c. 32, in *Col. Wolley-Dod's records,* I have given it the N.C.R. mark. This does not in the least imply that any record given in *Fl. Northamptonshire* for a particular var. or f. is unsound, and most certainly is not intended as a reflection upon any recorder. In most cases of real doubt, especially where a rare Rose was concerned, the specimen has been referred to Col. Wolley-Dod.

R. arvensis Huds.	
Var. *vulgaris* Ser.	
f. *major* Coste	7.—Ailsworth Heath. Upton Heath (towards *laevipes* Grem.).
*f. *hispida* Léj. & Court.	4.—Ashton, *W.*
	7.—Upton. Southey Wood, Ufford.
*Var. *ovata* (Léj.) Desv.	4.—Ashton. Helpstone.
*Var. *biserrata* Crép.	4.—Ashton.
?*Var. *laevipes* Grem.	7.—Upton, *W.* (Near this var., but in view of a few glands on peduncles I can only record as N.C.R. with a query.)
*Var. *gallicoides* (Déségl.) Crép.	4.—Ashton. *W.*
	7.—Castor Hanglands. Upton (good forms from at least two distinct stations. Some of those from Upton Heath are truly magnificent, the best I have ever seen.) Marholm (very weak f.), *W.* Collyweston Great Wood.
R. canina L.	
Var. *lutetiana* (Lem.) Baker	4.—Ashton. Bainton. Ufford, *W.* Easton-on-the-Hill, *W.*
	7.—Upton, *W.*
?*f. *lasiostylis* Borb.	4.—Barnack (not without doubt, so will record as N.C.R. with a query).
Var. *sphaerica* (Gren.) Dum.	4.—Bainton (nearest *sphaerica*, but off type).
*Var. *flexibilis* (Déségl.) Rouy	7.—Upton Heath (confirms a doubtful record).
Var. *senticosa* (Ach.) Baker	4.—Ashton, *W.* Bainton.
	7.—Ailsworth (nearest this var). *W.*
f. *mucronulata* (Déségl.) W.-Dod	4.—Barnack. Bainton. *W.*
	7.—Upton Heath. Wittering, *W.*
Var. *spuria* (Pug.) W.-Dod	4.—Pilsgate. Ashton.
f. *syntrichostyla* (Rip.) Rouy	4.—Bainton.
	7.—Ailsworth, *W.* Whitewater. Collyweston Great Wood, *W.*
Var. *globularis* (Franch.) Dum.	4.—Ashton.
Var. *ramosissima* Rau	4.—Barnack.
	7.—Upton Heath, *W.*
Var. *dumalis* (Bechst.) Dum.	4.—Ashton, *W.* Bainton, *W.*
	7.—Upton Heath. Ailsworth Heath, *W.* Collyweston Great Wood, *W.*
f. *viridicata* (Pug.) Rouy	4.—Helpstone. Ufford, *W.*
	7.—Upton Heath. Marholm.
f. *cladoleia* (Rip.)	4.—Bainton. Ashton, *W.* Ufford, *W.*
	7.—Ailsworth Heath. Upton, *W.* Wittering, *W.*
Var. *stenocarpa* (Déségl.) Rouy	7.—Wittering, *W.* (nearest *stenocarpa*).
*Var. *medioxima* (Déségl.) Rouy	4.—Helpstone.
	7.—Collyweston Great Wood, *W.*
*Var. *biserrata* (Mér.) Baker	4.—Ashton, *W.*
*f. *eriostyla* (Rip.) W.-Dod	7.—Upton Heath (confirms a doubtful record).
*Var. *Carioti* (Chab.) Rouy	7. Upton Heath.

?*Var. *fraxinoides* H. Br.	7.—Southey Wood, Ufford. (Nearest *fraxinoides*, but recorded with some doubt.)
*f. *recognita* Rouy	4.—Lolham (passably good), *W.* Ashton. Helpstone. Ufford, *W.* 7.—Ailsworth. (All ± untypical, most not free from doubt.)
*Var. *sylvularum* (Rip.) Rouy	4.—Helpstone. Ashton, *W.* 7.—Wittering, *W.* (At least four gatherings from different bushes). Ailsworth.
*f. *adscita* (Déségl.) Rouy	4.—Ashton. 7.—Ailsworth Heath, *W.* Upton Heath.
Var. *andegavensis* (Bast.) Desp.	4.—Ashton. Bainton. Helpstone, *W.* 7.—Upton, *W.*
Var. *verticillacantha* (Mér.) Baker	4.—Ashton, *W.*
*f. *Lemaitrei* (Rip.) W.-Dod	7.—Upton Heath, *W.*
?*Var. *Schottiana* Ser.	7.—Marholm (with slight doubt).
Var. *Blondaeana* (Rip.) Rouy	
*f. *Beatricis* (Burn. et Greml.) Rouy	7.—Upton Drift. Upton Heath, *W.*
R. dumetorum Thuill.	
Var. *typica* W.-Dod.	4.—Ashton, *W.*
f. *urbica* (Lem.) W.-Dod	Too common in 4 and 7 Divisions to mention localities.
f. *semiglabra* (Rip.) W.-Dod	4.—Bainton. Ashton, *W.* 7.—Ailsworth Heath, *W.* Marholm, *W.* Near Pilsgate (towards Wittering).
*Var. *ramealis* (Pug.) W.-Dod	4.—Ashton, *W.* Helpstone.
Var. *Gabrielis* (F. Gér.) R. Kell.	4.—Ashton, *W.* 7.—Upton. West of Southey Wood. Ailsworth Heath, *W.* Marholm, *W.*
?*Var. *calophylla* Rouy, non Chr.	4.—Ashton (but off type).
Var. *platyphylla* (Rau) W.-Dod	4.—Bainton. Ashton, *W.* Barnack. 7.—Ailsworth Heath. Marholm (with some doubt). (Mostly with untypically rather small leaflets. Personally, I am sorry that Wolley-Dod dropped *jactata* Déségl., and merged it in *platyphylla*.)
Var. *sphaerocarpa* (Pug.) W.-Dod	
*f. *spinetorum* (Déségl. et Ozan.) W.-Dod	4.—Ashton, *W.* (I think this is good enough to confirm a previous doubtful record for the County.) 7.—Marholm (towards *sphaerocarpa*). Near Pilsgate, *W.*
Var. *hemitricha* (Rip.) W.-Dod	4.—Ashton. Barnack. 7.—Ailsworth Heath. Upton, *W.*
Var. *incerta* (Déségl.) W.-Dod	4.—Bainton, *W.* Ashton, *W.* 7.—Upton Heath. Marholm, *W.*
R. coriifolia Fr.	
Var. *typica* Chr.	
*f. *frutetorum* (Bess.) W.-Dod, non Chr.	7.—Wittering, just above the Marsh, *W.* (Confirms a doubtful record.)
*Var. *subcollina* Chr.	7.—Wittering, *W.*

R. obtusifolia Desv.	
?*Var. *typica* W.-Dod	7.—Near Pilsgate (not quite satisfactory, so record with a query).

[To us, residents in Surrey, where this variety is so common, its almost total absence from Northamptonshire seems very strange. The more so, as the other rarer *Obtusifoliae* are so much in evidence in the latter county. But Wolley-Dod's records do not show it from any adjacent county, except Warwick which is remote from our special corner of Northamptonshire.

The records under *obtusifolia*, in *Fl. Northamptonshire*, evidently refer to the aggregate species, not to var. *typica*.

Possibly the two records for Leicestershire, by A. E. Wade, in the recently published *Fl. Leicestershire and Rutland* (under "Sub-var. *typica* Chr."), may refer to var. *typica* W.-Dod.]

Var. *tomentella* (Lem.) Baker	4.—Ashton, *W.* Lolham, *W.* 7.—Ailsworth Heath, *W.* Upton.
f. *canescens* (Baker) W.-Dod	4.—Helpstone. 7.—Wittering (with some doubt).
Var. *decipiens* Dum.	
*f. *glandulosa* Crép.	7.—Upton.
Var. *Borreri* (Woods) W.-Dod	4.—Bainton. Ashton. Helpstone, *W.* 7.—Ailsworth Heath.
Var. *sclerophylla* (Scheutz) W.-Dod	4.—Bainton. Ashton. Helpstone. 7.—Ailsworth Heath, *W.* Upton Heath, *W.* Wittering. (Fairly frequent in our area.)
Var. *Rothschildii* (Druce) W.-Dod	4.—Bainton, *W.* Ashton. Lolham. Helpstone, *W.*

[This most striking and distinct Rose is not uncommon in some parts of our area, especially at and about Ashton. My sister also found it in Lincs (S.). v.-c. 53, and Rutland (part of v.-c. 55), in each case a N.C.R. Its extreme forms are truly magnificent. My sister and I have much sympathy with Druce in giving it specific rank. We know nothing of chromosomes, and but little of the intricacies of plant physiology, etc. On the field, and in subsequent herbarium examination, *Rothschildii* seems to us as deserving of being considered a species as either *Sherardi* or *agrestis*. Some of its marked characters suggest affinity with Subseries *Rubiginosae*. Perhaps its nearest (or rather least distant) relative in our British flora is the very rare *seticaulis* W.-Dod, whilst somewhat more remote are *sclerophylla* and *Borreri*, its present neighbours in Wolley-Dod's "Revision." Indeed, quite frequently, these two last-mentioned are actual neighbours of *Rothschildii* on the field in our corner of Northamptonshire, and also occasionally in those parts of Rutland and South Lincolnshire visited by us. Possibly, in some future disturbance of our present classification, these four (*i.e.*, *Borreri*, *sclerophylla*, *seticaulis* and *Rothschildii*) may be constituted a separate Group of the *Obtusifoliae*.]

R. tomentosa Sm.	
*Var. *typica* W.-Dod	4.—Ashton, *W.* Helpstone. 7.—Ailsworth Heath, *W.* Upton Heath. Castor Hanglands. Collyweston Great Wood, *W.*
*f. *eglandulosa* W.-Dod	4.—Ashton, *W.*
*Var. *pseudo-cuspidata* (Crép.) Rouy	4.—Lolham Bridges, *W.* 7.—Ailsworth Heath (not without doubt).
Var. *scabriuscula* Sm.	4.—Ashton, *W.* 7.—Ailsworth, *W.* Oldfield Common, *W.* Marholm.
R. rubiginosa L.	
Var. *typica* W.-Dod	4.—Barnack, *W.* 7.—Ailsworth Heath, *W.*
*Var. *rotundifolia* Rau	7.—Ailsworth Heath, *W.*
*Var. *echinocarpa* (Rip.) Gren.	7.—Upton (quite good), *W.* Ailsworth Heath (rather weak f.), *W.*
R. micrantha Sm.	
Var. *typica* W.-Dod	4.—Ashton, *W.* 7.—Southey Wood, Ufford, *W.* Upton, *W.* Ailsworth Heath, *W.*
Pyrus communis L.	
Var. *Pyraster* (L.)	7.—Upton, *W.*
Crataegus Monogyna Jacq.	4.—Ashton. (A most interesting and striking form, with very small flowers in dense clusters, very small leaves, and long prickles which constitute its very short branches. Quite new to me, and I know no var. under which to place it.)
C. monogyna Jacq. ×*oxyacanthoides* Thuill.	4.—Ashton, and elsewhere. 7.—Ailsworth, Upton, and elsewhere. (Often seen by us.)
C. oxyacanthoides Thuill.	4.—Bainton. Ashton. 7.—Ailsworth Heath. Upton Heath. (Rather common in our area.)
Ribes Uva-crispa L.	4.—Ufford, and elsewhere, *W.*
R. rubrum L.	4.—Bainton Ballast Pits, *W.* 7.—Walcot, *W.*
Sedum album L.	4.—Very common on walls at and about Bainton and Ashton.
Callitriche ? obtusangula	4.—Wothorp, abundant in pond near ruins of Manor House.
Epilobium tetragonum L.	4.—Bainton, *W.* 7.—Ailsworth Heath, *W.*
Œnothera odorata Jacq.	4.—Bainton Ballast Pits, *W.*
Sium erectum Huds.	4.—Bainton, *W.*
Pimpinella major Huds.	4.—Ashton, and elsewhere, *W.*
P. Saxifraga L.	
Var. *poteriifolia* (Wallr.)	4.—Barnack, *W.*
Œnanthe fistulosa L.	4.—Ashton.
Silaum Silaus (L.) Schinz & Thell.	4.—Ashton.
Galium Mollugo L. × *verum* L. (= *ochroleucum* Wolf.)	4.—Hills and Holes, Barnack, *W.* Ufford, *W.* (Good intermediates. In each case both putative parents growing very close to each other.)
Valerianella dentata (L.) Poll.	4.—Ashton. Barnack.
Var. *mixta* (L.)	4.—Ufford, *W.*

V. carinata Lois.	4.—Bainton Ballast Pits, *W.* (Only one other station given by Druce in the county.)
Erigeron acer L.	4.—Bainton Ballast Pits, *W.*
Gnaphalium sylvaticum L.	7.—Ailsworth Heath. (Not uncommon in this one spot.)
Inula squarrosa (L.) S. & T.	4.—Ashton, *W.* 7.—Ailsworth Heath.
Matricaria suaveolens (Pursh) Buch.	4.—Bainton. Ashton, *W.*
Senecio viscosus L.	4.—Bainton Ballast Pits, in abundance.
Carlina vulgaris L.	7.—Ailsworth Heath.
Cirsium eriophorum (L.) Scop. Var. *britannicum* (Petrak)	7.—Ailsworth Heath (very fine). Upton, *W.* Marholm, *W.*
Onopordon Acanthium L.	7.—Near Castor Hanglands, *W.*
Centaurea Scabiosa L.	7.—Barnack (rayed and non-rayed forms with pure white flowers), *W.* Marholm (with very beautiful musk-white flowers), *W.*
C. Cyanus L.	7.—Ailsworth, *W.*
Cichorium Intybus L.	4.—Bainton Ballast Pits, *W.* 7.—Ailsworth, *W.*
Picris Hieracioides L.	4.—Ufford Quarries.
Leontodon nudicaulis (L.) Banks	7.—Ailsworth Heath, *W.*
Lactuca virosa L.	4.—Bainton Ballast Pits, *W.*
Tragopogon pratensis L. (As segregate =*genuinus* Syme, in which floret rays equal phyllaries)	7.—Barnack, towards Whitewater. Ailsworth. *J. E. S. Dallas.*
Calluna vulgaris (L.) Hull	7.—Southey Wood, Ufford, *W.*
Samolus Valerandi L.	7.—Ailsworth Heath, *W.*
Syringa vulgaris L.	4.—Bainton.
Ligustrum vulgare L.	Seemingly native in several places, but most abundant and quite at home on Ailsworth Heath (Division 7). Here it is often almost a dominant shrub, a great attraction to the numerous butterflies found on the Heath.
Blackstonea perfoliata Huds.	7.—Southey Wood, Ufford. Walcot, *W.* Ailsworth Heath.
Menyanthes trifoliata L.	4.—Lolham Bridges, *W.*
Myosotis caespitosa K. F. Schultz	7.—Upton Heath, *W.*
M. arvensis (L.) Hill. Var. *sylvestris* (Schlecht.)	7.—Southey Wood, Ufford, *W.*
Lithospermum officinale L.	4.—Ufford, *W.*
L. arvense L.	7.—Upton.
Echium vulgare L.	4.—Bainton Ballast Pits, *W.* 7.—Ailsworth Heath.
Cuscuta epilinum L.	7.—On a detached portion of Ailsworth Heath. All three species growing more or less together in dense masses, parasitic on many host plants, extending over more than an acre. All submitted to Mr W. H. Pearsall, and named by him.
C. europaea L.	
C. trifolii Bab.	
Verbascum virgatum Stokes	4.—Bainton Ballast Pits, *W.*
Linaria spuria (L.) Mill.	4.—Ashton.
L. Elatine (L.) Mill.	4.—Bainton, *W.* 7.—Barnack.

Digitalis purpurea L.	7.—Southey Wood, Ufford, *W.* Ailsworth Heath, *W.*
Veronica aquatica Benquerel	7.—Ailsworth Heath.
Bartsia Odontites Huds.	
Var. *verna* (Reichb.)	7.—Upton, *W.*
Melampyrum cristatum L.	7.—Still in fair quantity at a station (extending for about 100 yards) in Ufford Parish. Probably the same as that given in *Fl. Northamptonshire*, p. 174. " Ufford, *H. C. Watson Herb.*, 1831."
Orobanche major L.	4.—Bainton, *W.* Ufford Quarries, *W.*
	7.—Ailsworth, *W.* Marholm, *W.* (Locally rather common, in restricted spots. Fine plants.)
Origanum vulgare L.	
Var. *albiflorum* Lej.	4.—Ufford Quarries, *W.*
	7.—Ailsworth Heath.
Satureia ascendens (Jord.) Dr.	4.—Ashton.
S. Acinos (L.) Scheele	7.—Upton.
Nepeta Cataria L.	4.—Ufford, *W.*
	7.—Barnack, towards Whitewater, *W.*
Lamium amplexicaule L.	4.—Ufford.
	7.—Southorp.
Polygonum Convolvulus L.	
Var. *subalatum* Lej. & Court.	4.—Duddington.
P. petecticale (Stokes) Dr.	4.—Bainton, *W.*
Rumex pulcher L.	4.—Bainton, *W.* Ufford, *W.*
Daphne Laureola L.	4.—Ashton.
Euphorbia platyphyllos L.	7.—Ailsworth.
Ulmus × *hollandica* Mill. (probably)	7.—Edge of Walcot Park (along Ermine Street), abundant, *W.*
Betula alba L.	7.—Southey Wood, Ufford, *W.*
Betula pubescens Ehrh.	7.—Southey Wood, Ufford, *W.*
?**Quercus Robur* L.	
×*sessiliflora* Salisb.	7.—Southey Wood, Ufford, *W.* Collyweston Great Wood, *W.*
Q. sessiliflora Salisb.	4.—Helpstone.
Q. Cerris L.	7.—Walcot, with self-sown seedlings.
Juglans regia L.	4.—Hills and Holes, Barnack. Ufford Quarries. (Sturdy saplings, 3 or 4 feet high, obviously not deliberately planted.)
Populus tremula L.	7.—Southey Wood, Ufford.
Orchis pyramidalis L.	4.—Ufford, *W.*
	7.—Ailsworth Heath. Upton, *W.* Walcot, *W.* Wittering, *W.*
Aceras anthropophora (L.) Br.	4.—Ashton. Easton-on-the-Hill, *W.*
Ophrys apifera Huds.	4.—Ashton.
	7.—Southey Wood, Ufford, *W.*
Habenaria virescens (Zollik) Dr.	7.—Ailsworth.
Allium ursinum L.	7.—Southey Wood, Ufford, *W.*
Juncoides pilosum Morong.	7.—Southey Wood, Ufford, *W.*
Zannichellia palustris L.	7.—Ailsworth Heath.

Carex (Dill.) L.

All gatherings of this genus, in any sense critical, have been submitted to Mr W. H. Pearsall, who has been kind enough to name them for us in his usual thorough manner, unsparing of any trouble to himself.

Notes and comments by Mr Pearsall are set out below, under the various species and varieties.

C. *hirta* L.	
Var. *hirtaeformis* (Pers.) Kunth	4.—Ashton (pond at edge of Lawn Wood). "All fruits abortive through the action of mites," W.H.P.
Var. *spinosa* Mort.	4.—Bainton Ballast Pits (not an extreme form), *W*.
C. *binervis* Sm.	7.—Southey Wood, Ufford, *W*. Wittering Marsh, *W*. Ailsworth Heath (two distinct stations, about a mile apart), *W*. "All *C. binervis*," W.H.P.

This species is stated, in *Flora of Northamptonshire*, to be very rare in the county, and only one station is given—Evenley Camp (No. 2 Division). This is in the extreme S.W., more than fifty miles distant from either of our stations. Both *C. distans* and *C. fulva* have been recorded from Wittering Marsh, but we have not yet found either species there.

C. *flava* L.	7.—Wittering Marsh. "*C. flava* (type)," W.H.P.
C. *lepidocarpa* Tausch	7.—Wittering Marsh, *W*. "*C. lepidocarpa*," W.H.P.
C. *Goodenowii* Gay	
Var. *recta* Fleischer	7.—Ailsworth Heath. "Probably the f. *aquatiformis* Kükenth., which has narrow glumes," W.H.P.
Var. *stenocarpa* Kük.	7.—Wittering Marsh, *W*. "An extreme f. of *stenocarpa* with glumes very long, exceeding the fruit and *very acute*." W.H.P.
Var. *strictiformis* L. H. Bailey	7.—Wittering Marsh. "Var. *strictiformis* L. H. Bailey," W.H.P.
C. *leporina* L.	
Var. *longibracteata* Peterm.	7.—Upton Heath (growing with type), *W*.
C. *vulpina* L.	
Var. *nemorosa* (Rebent.) Lej.	4.—Ashton.
C. *contigua* Hoppe (*muricata* L.)	7.—Ailsworth Heath, *W*. Some of these are "abnormal plants with *elongate* fruits (8-9-10 mm.×2 mm.) containing nothing but abortive orange (galled ?) ovaries, not developed." W.H.P.
f. *pallida* Appel ex Woerlein	7.—Upton, *W*. (So named by W.H.P.)
C. *disticha* Huds.	
Var. *longibracteata* (Schleich.)	7.—Wittering Marsh.
C. *dioica* L.	7.—Still growing in Wittering Marsh (1933), E.B.B.

GRAMINEAE.

Our Grasses have been submitted to Mr W. Biddiscombe, who has kindly devoted much time and attention to them. All critical determinations are his, and the names set out here are given on his authority.

Milium effusum L.	7.—Southey Wood, Ufford.
Calamagrostis epigeios (L.) Roth	4.—Bainton, *W.* Ashton, *W.* Ufford, *W.* 7.—Ailsworth Heath, *W.*
Deschampsia caespitosa (L.) Beauv.	
Var. *argentea* S. F. Gray	4.—Ashton, *W.*
Trisetum flavescens (L.) Beauv.	7.—Wittering Marsh, *W.*
Var. *variegatum* (Mert. & Koch)	4.—Ashton, *W.*
Cynosurus echinatus L.	4.—Bainton Ballast Pits, *W.*
Koeleria britannica (Domin) Dr.	4.—Ufford, *W.* 7.—Upton Heath, *W.*
Briza media L.	
Var. *albida* Lej.	7.—Wittering Marsh
Poa pratensis L.	
Var. *strigosa* Parn.	7.—Upton, *W.*
Glyceria fluitans (L.) Br. × *plicata* Fr. (=*pedicellata* Townsend)	7.—Upton Heath, *W.* Wittering Marsh, *W.*
G. plicata Fr.	4.—Wothorp, *W.* 7.—Upton Heath, *W.*
Var. *declinata* (Breb.)	4.—Wothorp, *W.*
Festuca elatior L.	
Var. *pseudo-loliacea* (Hack.)	4.—Bainton, *W.*
F. elatior L. × *Lolium perenne* L. (×*F. adscendens* Retz.)	4.—Easton-on-the-Hill, *W.*
F. Bromoides L.	4.—Bainton, *W.* Ufford, *W.*
**Bromus rigens* L. (=*maximus* Desf.)	4.—Bainton, by roadside, *W.* N.C.R. not only to *Flora of Northamptonshire*, but also to *Comital Flora*.
Brachypodium pinnatum (L.) Beauv.	
Var. *pubescens* S. F. Gray	4.—Ufford (Upton Lane), *W.*
Var. *corniculatum* Breb.	7.—Upton Heath, *W.*
(near possibly a ×)	7.—Upton (Upton Lane), *W.*
Var. *compositum* Parnell	4.—Barnack, *W.* Duddington, *W.*
Agropyron repens L.	
Var. *Leersianum* S. F. Gray	4.—Ufford (Upton Lane), *W.*
Hordeum nodosum L.	7.—Upton, *W.*
Elymus europaeus L.	4.—Ashton, *W.* Barnack, *W.* 7.—Ailsworth Heath, *W.*
Equisetum maximum Lam.	7.—Wittering, *W.*
Asplenium Trichomanes L.	4.—Barnack, *W.*
A. Ruta-muraria L.	4.—Ufford, *W.*
Dryopteris aristata (Vill.) Dr.	7.—Southey Wood, Ufford, *W.*
Ophioglossum vulgatum L.	7.—Ailsworth Heath, *W.*

VARIATION AND A VARIANT OF CERASTIUM VULGATUM FROM DORSET.

W. B. TURRILL, D.Sc., F.L.S.

The study of intraspecific variation is becoming increasingly important with the advent of new methods of botanical research, which have often a very direct bearing on taxonomic problems. Taxonomy is, or should be, the alpha and omega of botanical investigations. The geneticist, cytologist, ecologist, and workers in other branches of botany need to have their plants identified with the utmost possible precision. On the other hand, their results may lead to revision of taxonomic opinions, such as the status to be given to some morphological entity or the interrelationships of a group of species. Most certainly the controlled breeding of plants and the intensive autecological field studies now being increasingly pursued are modifying our views with regard to the polymorphism of species. It is being shown that there are many kinds of variation within what is usually accepted as a taxonomic species and it is probable that the taxonomist will eventually be forced to modify both his theory and his practice. For the moment, the writer and some of his colleagues are collecting data and experimenting, in a non-revolutionary manner, with various possibilities.

It seems advisable to use the term " variation " in a wide sense to include all deviation from a standard. It is becoming customary to fix a specimen as the taxonomic type of a species. Such a specimen fixes the specific name to plants accepted as conspecific with it. It further supplies a standard for defining variation *in a taxonomic manner*.* Unfortunately for many common European species no real type specimen exists, no adequate figure was provided by the author of the earliest name, and the original description is frequently meagre. This state of affairs is often more unfortunate for the student of variation than for the nomenclaturist (1) (2). How far " type specimens " should be chosen for such species, how they should be chosen, who should choose them, and where they should be kept when chosen, are matters for careful thought. In the meantime it is often advisable to fix a standard for a species or subspecific unit from material in one of the public herbaria, or to fix a standard and to deposit the material in a public herbarium. Such a standard specimen at least gives an indisputable basis for research in the sense of avoiding vagueness and ambiguity.

That there are fundamentally different kinds of variation has been clearly shown by much recent work. Broadly speaking, there is fluctuation and genic variation. In the former, deviation in morphological and/or physiological characters is caused by different environmental factors acting on the same gene complex. In the latter, different gene complexes are acted on by the same or different environmental factors. Both fluctuation and genic variation require, however, a much deeper analysis than this and it is hoped to supply one, with a definite taxonomic bias, at a later date. One *must* admit that some deviations within any species are due to different environments in the sense that they only appear in these environments, while there may be others which indicate real constitutional differences. Both kinds of variation are much greater than acknowledged in any descriptive British flora. It is useless for the taxonomist to ignore variation. At least, if he does, he will become more and more ignored by workers in other branches of botany and the hope of combined team-work will be lessened. There arises, then, the important question as to how variations should be treated by the taxonomist. It is probable that some compromise is best for the moment between those who argue that varieties (genic variations) and forms (fluctuations) should not be given names and those who give names to every specimen showing more than a very small deviation from an accepted standard. The writer has previously pointed out (3) how absurd it is to attempt to give names to all varieties originating through hybridisation of accepted species, back-crossing, and the resultant segregation. Such varieties are combinations of characters and a simple mathematical exercise shows that there are frequently hundreds of thousands of combinations any of which may equally well occur as any other. To burden nomenclature with names for all of them is useless and absurd, to deny or finally ignore their existence is unscientific.

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*It is unavoidable that, with existing methods, the taxonomic type may or may not have characters coinciding with mean or modal values for the species.

A similar problem (not, however, quite the same) has been solved for intraspecific hybridisation in *Silene vulgaris* (*S. Cucubalus*, *S. angustifolia*, etc.) and *S. maritima* by the adoption of letter and figure symbols by means of which any variety can be precisely defined in one or two lines of print in such a manner that any one variety (or any individual specimen) can be quickly and accurately compared with any other (4). The scheme avoids the absurdities of subordinate classification (5) or of character-naming of " varieties " (6). A similar scheme has been applied to intra-specific variation in *Glaucium* (7) and is being tested in other genera. It is capable of modification and has the great advantages of precision, conciseness, indefinite elasticity, and of avoiding additions to an overburdened nomenclature. It is possible that a great simplification and much increased accuracy of determination could be obtained in such genera as *Rosa* and *Rubus* by the use of a similar scheme with certain modifications. The problems of so-called sub-species and the difficulties inherent in the taxonomic study of apomictic plants (*Taraxacum*, *Hieracium*, *Alchemilla*, etc.) cannot be considered here, but it is obvious that existing treatments are very unsatisfactory.

There remain for consideration those numerous genetic variations which result directly from mutations. Plants showing these deviate from the type in one or more characters. A single gene mutation may modify quite a number of characters and conversely one character is affected by many genes—indeed, by the gene complex. We cannot, therefore, balance genes and phenotypic characters in any simple quantitative manner, such as "one gene, one character" or "one character, one gene." Yet gene mutations are of great scientific interest and the taxonomist must recognise them by description. He can apply names to them as variant units of his specific type, or he can use symbols other than Latin names, or he can modify his specific description (and sometimes his differential diagnosis) to include their characters. The last method has the great disadvantage that an emended specific description is needed whenever a new mutant is found. The least ambiguous method taxonomically is to have a full description of the type specimen and to give all deviations from this recognition as varieties or forms. It has, however, to be remembered that the type specimen has, as such, no more botanical value than any other equally well prepared specimen. That is to say, it can tell us no more about the characters or distribution of the species (which is a general population) than any other specimen. There is also the difficulty, already indicated, that the type specimen may have characters deviating widely from the species (population) as a whole. This difficulty is probably not often acute or of practical importance. It is doubtful if a full symbolic scheme can often be used advantageously for varieties originating directly from mutations and occurring spasmodically in a species, until intensive and extensive studies (herbarium, field, and controlled breeding) have been made on the species as a whole. That is to say, there has to be a tentative recording of such varieties, and names may well be given to such as are particularly well-defined morphologically and/or have some special interest (ecological, phytogeographical, genetical, or economic). At the same time it is undesirable to publish new names merely for the sake of labelling. An unnecessary name is a curse and no new name should be given unless it is really needed.

Some of the above remarks are illustrated by a *Cerastium* collected by Mr J. E. Lousley in Dorset and sent by him to Kew for identification. No difficulty was experienced in naming the plant *Cerastium vulgatum* L. var. *murale* (Desp. ex DC.) Gren. The interest lies in deciding what is its status relative to or within the species *C. vulgatum*. This last name is adopted in the sense of Babington (8, p. 65). Rouy and Foucaud (9, p. 206) use the name *C. triviale* Link, and Ascherson and Graebner (5, p. 637) the name *C. caespitosum* Gilib.

The following is the known history of the variant. De Candolle (10) published, as a species, *Cerastium murale*, with the following description: "Au milieu des nombreuses variations du *C. commun*, on ne peut affirmer d'une manière positive si cette plante est une espèce particulière; elle parait cependant distincte par sa racine plus dure, peut-être vivace, par ses tiges droites, un peu roides, par sa superficie très-velue, mais non visqueuse; par ses feuilles pointues et non très-obtuses; elle ne peut se confondre avec le *C. visqueux*, parce que les pédicelles n'y sont pas plus longs que les fleurs ..? Cette plante m'a été communiquée par M. Desportes, qui l'avait observée aux environs du Mans." In the

Prodromus (11) he supplies a Latin description in the following terms: "*C. murale* (Desp. in DC. Fl. Fr., 5, p. 609), hirsutum suberectum rigidum, foliis ovato-oblongis acutis numerosis, floribus fasciculatis longitudine pedicelli, petalis emarginatis calycem aequantibus, capsulis oblongis calyce calycem vix superantibus. ♃? Circa Coenomanum. (v.s. comm. à cl. Desp.)."

Holandre (12) supplied a description in French which also seems worth quoting: "Elle est très-velue et très rameuse, en touffes composées de tiges droites, roides et dures, hautes de 2 à 3 pouces, garnies de feuilles très-nombreuses, plus longues que les entrenoeuds, ovales-oblongues, chargées de poils et blanchâtres ainsi que la tige et les pédoncules; fleurs ramassées en un bouquet serré au sommet de chaque tige, sur des pédoncules très-courts; pétales de la longueur du calice; capsules, oblongues, dépassant à peine le calice; capsules oblongues, dépassant à peine le calice. Bisann. ou viv. Fl. en juin. Sur les rochers et sur les murs; je l'ai recueilli sur la montagne du Calvaire, près de Sarrelouis."

A specimen of Holandre's is preserved at Kew and, with the above descriptions, serves to fix Mr Lousley's plant as belonging to the same entity.

Grenier (14) reduced the species to *C. vulgatum* var. *murale*. Rouy and Foucaud (9, p. 207) use the name *C. triviale* Link var. *murale*. Ascherson and Graebner (5, p. 642) follow Gürke (15) and place the plant (as a sub-var.) under *C. caespitosum* and note that it occurs "auf Mauern, an Felsen und in Geröllen sehr zerstreut." Preuss (13) describes and figures, under the name *C. triviale* fr. *maritimum*, a plant which is very similar to that now being discussed and which belongs to the same taxonomic entity so far as one can judge from description and figure only. It was found between Gdingen and Oxhöft, in East Prussia at the time of publication, now in Polish territory.

Since *C. vulgatum*, *C. triviale*, and *C. caespitosum* are, from the standpoint of the above authors, intended as names of the same species, it follows that the supposed taxonomic entity we are considering has been accepted as a species, a variety, a sub-variety, and a form. Further, the possibility of hybrid origin, with *C. vulgatum* and *C. viscosum* L. (*C. glomeratum* Thuill.) as parents, cannot be entirely ignored.

Mr Lousley has kindly supplied the following field notes regarding the material collected by him in 1932 and 1933: "It grows on an unenclosed part . . . near Wareham, Dorset, in company with *Trifolium glomeratum* (and I think *scabrum*), *Sagina apetala*, *Potentilla argentea*, *Hypochoeris glabra*, *Sagina ciliata*, *Thrincia hirta*, and other *Cerastia*—the typical vegetation of heaths of that part. I have no doubt at all that it is native. The *Cerastium* grows in small quantity scattered over about an acre of ground. It is not a starved form, as I at first thought, as it remains quite constant when growing in the shelter of other vegetation. I do not think it is connected with nibbling by rabbits, as there is plenty of *glomeratum* and *vulgatum* practically bitten down to the ground, but showing no malformation."

The following description has been drawn up from Lousley's material: A perennial or biennial low-growing plant growing in tufts. Stems much branching from the base, the flowering ones 1.5 to 10 cm. high, the internodes very short and mostly hidden by the leaves, in the upper part with a dense indumentum of spreading hairs of different lengths but eglandular, in the lower part tending to become glabrescent. The leaves are oblong-lanceolate, sub-acute, sessile and only slightly narrowed at the base, about 7 mm. long and 3 mm. broad, with long distinct hairs on both surfaces. In most of the flowering stems the leaves are longer than the internodes and, in the dried material, they stand erect, so that one pair is imbricated over the next higher pair and little or no stem is visible till the leaves are bent back. Inflorescence of 2-16 flowers, compact, the pedicels up to 4 mm. long, but generally much shorter than this and the flowers frequently nearly sessile, densely hairy as the upper stem internodes. On several flowering branches the stem internodes are rather longer and the pedicels reach a maximum length, giving a looser appearance to the inflorescence. Bracts hairy, upper with narrow membranous margins; lower herbaceous. Sepals 5, 5 mm. long, with membranous margins. Petals (in all flowers dissected) 4, oblong or oblong-spathulate, apex emarginate, 3 mm. long. Capsule often poorly developed, splitting early into valves and not projecting beyond the persistent calyx; in a few of the looser inflorescences single capsules project 1-2 mm. beyond the sepals. Apparently relatively few good seeds developed, but some have been seen in the better formed capsules and these had the characters of those of *C. vulgatum* (typical British material) but were slightly smaller.

The account and description given above must confirm the identification of the Dorset plant as *C. vulgatum* L. var. *murale* (Desp. ex DC.) Gren., and this is the best tentative determination if a name is really desirable. Yet such a determination tells us little beyond indicating an unknown relationship with *C. vulgatum* L. and permitting the statement that plants with similar characters have occurred in France and the Polish Corridor.

Various questions can be asked which can only be answered by further intensive investigation. Does the plant set viable seed? If it is itself fertile, do all or some of the offspring from selfing reproduce the supposed varietal characters? If not, what are the environmetal causes of the peculiar characters. Are they due to disease? (Some cells with dark contents were noted in association with some of the leaves and Miss E. M. Wakefield has kindly determined the presence of *Septoria Cerastii* Rob.) Do plants showing characters intermediate between this and typical *C. vulgatum* occur in the neighbourhood? Can the var. *murale* and typical *C. vulgatum* be crossed and with what results to the F_2 generation? Is the var. *murale* better adapted to certain environmental conditions than is typical *C. vulgatum*? Are there any striking features in the life-history—seed germination, seedling behaviour, flowering period, duration, seasonal aspects, etc.? And so on. Answers to these questions might well confirm the taxonomic status of the plant as a variety of *C. vulgatum*, or might, on the other hand, show it to be a mere habitat form, an aberrant form caused by some pathological agent, or a hybrid or hybrid segregate.

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MINTS THAT SPORT.

J. FRASER.

Collectors of Mints may have noticed that the early leaves of some of the species look quite different from those present at the time the plants are in bloom, when they are usually collected. *Mentha longifolia* Huds. is noticeable in this respect. The primordial leaves in May and June look quite green and apparently glabrous to the naked eye, but a lens will show that they are thinly pubescent, with short hairs on both sides. By the time the plants come into bloom most of these primordial leaves have fallen, and the upper cauline leaves are densely pubescent on the upper side, tomentose beneath, and their whole aspect is grey. × *M. niliaca* Jacq., var. *sapida* (Tausch) Briq., behaves in a similar way, being relatively thinly hairy in early summer and grey-white when in bloom. Briquet described specimens from Angus in 1913 as *Valde lanigera*. I do not consider these two samples as sports. The condition of the early leaves merely indicates that the natural situation of Mints is in or near water, and the ultimate hairiness a provision of nature to prevent undue transpiration (loss of water).

It is well known, I think, that *M. rotundifolia* Huds. gathered by roadsides and other dry places has very hairy or tomentose leaves; but in wet places and on river banks the leaves are thinly pubescent above but sometimes, at least, a little more hairy beneath. Specimens of this type I gathered in 1885 on the banks of the R. Towy, at Carmarthen, with the roots in water, and also on wet ground at Pennar, Pembroke. Plants in the garden from Egloshayle, Wadebridge, give more densely pubescent leaves on the upper part of flowerless shoots, but the flowering ones are quite thinly pubescent. The plants at this station would appear to have escaped from a garden or were outcasts, for the leaves were slightly variegated with white for the first few years of cultivation. I have had no tomentose leaves of this species in the garden for the last thirty years, and flowers of one were white. This seems to me a form of sporting, induced by the tilled soil and an adequate supply of moisture.

Vegetative sporting of quite another kind occurs amongst hybrids. In 1914 I had a root of *M. rotundifolia* × *spicata* (×*M. cordifolia* (Opiz) Fraser), from Swanage, Dorset, and in 1922 it gave a hairy-leaved sport, with narrow leaves measuring 2.5-6 cm. long, and 5-19 mm. broad. This is a sport towards *M. spicata* in the narrow leaves, and slender flower spikes; and derives a dense pubescence and rugosity of the leaves from *M. rotundifolia*. A few years later the same hybrid gave rise to a sport with leaves like × *M. cordifolia*, but densely pubescent above and softly tomentose beneath; the stems and branches were also tomentose. During the very dry season of 1933 the leaves were lanceolate and more or less subcordate at the base. Whether or not the leaves will retain this narrow form remains to be seen. ×*M. cordifolia* has been a subglabrous Mint from the time of Linnaeus and Smith, with the smell and flavour of *M. spicata*.

By some authorities *M. piperita* L. is considered to be a hybrid, namely, *M. aquatica* × *spicata*, and as the type and varieties are mostly always functionally female, they are suggestive of this supposition. The leaves of the type vary considerably in the amount of pilosity. Only once have I seen the var. *subcordata* with a few perfect stamens. I have seen four varieties varying considerably in the width of the leaves, and it is just possible that all have arisen by sporting vegetatively from the original or from one another.

× *M. rubra* (Sm.) is reputedly the hybrid × *M. verticillata* × *spicata*, and as described by Smith the calyx tube and pedicels are quite glabrous, with a few cilia on the calyx teeth. The leaves have a sprinkling of hairs on both faces, especially on the midrib beneath. The variety *raripila* is considerably more hairy on the stem, leaves and their petioles. In the *B.E.C. Report* for 1929, I described the variety *Turreffi*, from a gathering of eighteen specimens gathered by the Rev. Francis Turreff on the banks of the Mill of Tifty Burn, Fyvie, Aberdeenshire. These were modelled on the plan of var. *raripila*, but the stem, leaves and petioles were very much more hairy but very irregularly so in different specimens, and on different leaves on the same stem. The tube of the calyx was thinly furnished with hairs, and the pedicels were glabrous or thinly sprinkled with hairs. Calyx and pedicels thus contravene or violate the recognised description of the group, yet I can see no evidence of a second cross with × *M. verticillata*. The calyx is tubular as in the type and most other varieties. I regard it as a sport from the var. *raripila* to which it is most closely allied, or independently from any other form. The composite characters of hybrids can become disassociated from one another vegetatively. We have evidence of this in hybrid Chrysanthemums, which often give rise to flowers of two different colours on the same plant, and sometimes to two forms of flowers. Roses, Carnations and Dahlias often hybridised or crossed in gardens may give two colours on the same plant, or half a flower of one colour and the other half different, and vegetatively in all these cases. Growers of these plants take cuttings of the sported portions, which remain permanent, or may sport again into a different colour.

The × *M. gentilis* group, or some of them, are very much given to sporting. The calyx tube and pedicels are normally glabrous, these characters being derived from the *M. spicata* parent. The reputed parents are *M. arvensis* and *M. spicata*. I have a sheet of × *M. gentilis* from Swanage, Dorset, with a few hairs on the calyx tube; another from Potterne, Devizes, with numerous hairs all over the calyx tube and, occasionally, a few on the pedicels; one from Speymouth, Morayshire (Coll. K. D. Little, 1929), with short hairs on the tube, especially at the base; and one from Stanmore, Middlesex (Coll. J. E. Lousley, 1928) in which the calyx is almost nude, even on the teeth.

Specimens from Broadham Green, Oxted, Surrey (Coll. Mrs R. W. Robbins and four others), are notable for the great length of the cilia on the calyx teeth. The reduced forms with extra hairs on the calyx and pedicels were in sandy soils or had suffered from drought. A specimen from a stream near Colbourne Station, Isle of Wight (Coll. J. H. A. Steuart, 1894) is notable for the great size of its leaves, resembling those of × *M. rubra*, but distinguished from that by its campanulate calyx. All these variations are disconcerting to collectors, but one must be guided by technical characters, when the specimens are more or less disguised.

× *M. gentilis*, var. *Wirtgeniana* (F. Schultz), sometimes sports with a few hairs on the pedicels, as shown by a specimen collected by H. J. Riddelsdell and Mrs Wedgwood at Symonds Yat, W. Gloucester, in 1925. Typically, × *M. gentilis* (L.), var. *cardiaca* (Baker) Briq., is subglabrous, the hairs being most prominent on the bracteoles and calyx teeth. It varies greatly in the length and breadth of the leaves and in being more hairy than it should be. Specimens I collected at Seven Stars, Ripley, Surrey, in 1901, had leaves up to 2 cm. wide. In a dry spot at the same station in 1912 the leaves were only 6-12 mm. wide. In the garden they became 1-7 cm. wide. Specimens from Woking in 1925 had leaves up to 6 cm. long and 1-9 cm. wide. In the garden they were wider, especially the primordial leaves. All these variations are due to soil and an adequate or inadequate supply of moisture. The sporting in this hybrid consists in the development of hairs on different parts of the plant. In 1925, amongst a colony of the typical form, in Fair Oak Lane, near Oxshot, Surrey, I collected a branching plant with narrow leaves, hairy stems and pubescent leaves, densely so on the upper ones and the floral bracts (leaves of some writers). While some of the whorls had only an excess of hairs on the calyx teeth, others had the calyx tube hairy all over. I have also passed through my hands a specimen collected by Dr Druce at Newbury, Berks, having short, ovate leaves, with a considerable development of hairs, as well as on the stems.

I have only seen one authentically named specimen of *M. gracilis* Sm., and that a poor one, collected at Saham, Norfolk. Smith's description just fits × *M. gentilis* L., var. *cardiaca* (Baker) Briq. Under it he quotes *M. gracilis*, Sole *Menth.*, 37, t. 16, and *M. gentilis*, Sole *Menth.*, 35, t. 15. Both of these figures can fit var. *cardiaca* quite easily. Smith had difficulty with his Mint and said: "In garden specimens I find the floral leaves vary too much in size to enable me to come to any positive determination." He also quotes *Ger. em.*, 680, *ex icone*, who named it *Mentha cardiaca*, Heart Mint.

NOTES ON THE VARIATION OF THE BRITISH SPECIES OF ZOSTERA.

By R. W. BUTCHER, Ph.D., F.L.S.

INTRODUCTION.

Grass Wrack, Eel Grass or Widgeon Grass (*Zostera* spp.) is an abundant plant in sandy or muddy estuaries, on the sea-shore and sometimes in salt lagoons. It is so abundant and widely distributed that, like so many common plants, it is frequently passed unnoted or unrecorded.

This plant has been brought into prominence during the last two years by the fact that it is reported to be dying away, through disease or some other cause, in a great many places along the Atlantic seaboard of Canada (9) and the United States (4) (8); in France (7), Holland, England (4) and Denmark (2). A survey, during autumn 1933, of a large part of the English coast where *Zostera* occurs, was made by the author in the course of his official work for the Ministry of Agriculture and Fisheries in order to discover the state, quantity and condition of the plant in this country. The report of this survey has been published in the " Journal du Conseil pour l'exploration de la mer " (3) so the ecological side of the problem need not be dealt with here.

The findings, however, have raised a very important taxonomic question with regard to the various forms and species which occur in this country. Briefly, as the result of the survey it was found that, whereas typical *Zostera marina* L. had evidently decreased to a marked extent, the forms usually known as *Zostera marina*, var. *angustifolia* Roth and var. *stenophylla* Aschers. and Graebner, and the second British species, *Zostera nana* Hornem., were still quite plentiful.

The question therefore arises as to whether these forms, known as *Zostera marina*, var. *angustifolia*, should be considered as (1) separate species, (2) hybrids and segregates between *Zostera marina* and *Z. nana*, (3) forms immune from the disease which is considered to be responsible for the diminished quantity of the plant as a whole or (4) merely ecads induced by a change of physiological or environmental conditions.

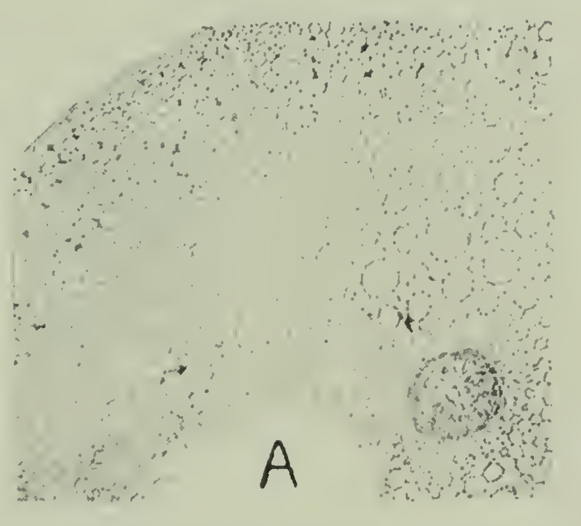
CHARACTERS OF THE SPECIES.

The chief taxonomic differences of the two species of *Zostera* which occur in Britain, though outlined in most works on the British flora, are not sufficiently comprehensive. The matter is dealt with more thoroughly in a monograph of the genus by Setchell (12). The chief differences may be summarised as follows:—

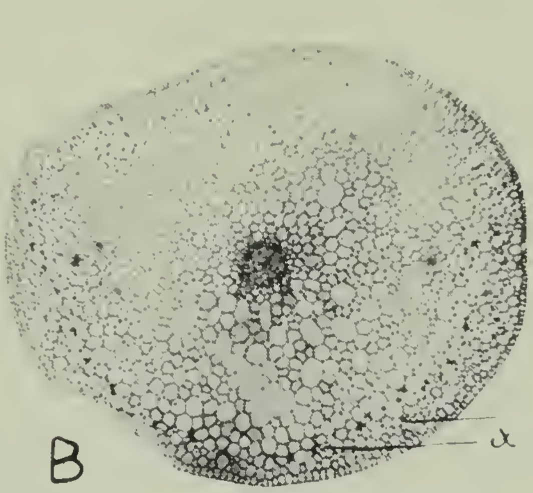
	Zostera marina L., type.	*Zostera nana* Hornem.
Stem.—	Transverse sections shows fibrous bundles in the outermost layers of the cortex and no starch grains (see fig. 1).	Transverse section shows fibrous bundles, not in the outermost cortex, but about one-third of the way to the centre. Starch grains abundant in cortical cells (see fig 2).

Fig. 1.

TRANSVERSE SECTIONS OF ZOSTERA STEMS.
x = fibre strands.



Z. MARINA L. from Walton on the Naze.



Z. MARINA, var. ANGUSTIFOLIA Hornem. from R. Blackwater.

BRIT. MUS.

Leaf.—	Leaves 4-6 mm. wide; veins 5 or 7.	Leaves 0.5-2 mm. wide, veins 1, or rarely 3.
	Squamulae intravaginales usually 4 at the base of each leaf.	Squamulae intravaginales 2 at the base of each leaf.
Inflorescence.—	Inflorescence without scales.	Inflorescence with small ligulate scales clasping the flowers.
Seed.	Brown, ribbed or furrowed.	White, almost smooth.

STATUS OF THE VARIETIES.

Some clue as to the status of *Zostera marina*, var. *angustifolia*, may now be found by discovering to what extent it possesses the salient characters of either species outlined above.

It should be emphasised that this variety shows very little uniformity in its size, width of leaf or number of veins. Sometimes it is found constant over a considerable area as, for instance, in the Fleet near Weymouth, but more frequently plants of all sizes may be discovered in a single, apparently uniform, area. A collection from the estuary of the Blackwater showed plants with leaves of all sizes from 1 to 4 mm. wide and from 10 to 100 cm. long. The size also bore very little relation to the tendency to flower.

1. *The Stem.* Sauvageau (11) was the first to point out certain important differences of the arrangement of the fibrous tissue in the stems of *Zostera marina* and *Z. nana*. These differences have since been confirmed by other workers using material from all parts of the world. This character of the position of the fibres in the cortex may therefore be considered to be reliable. The material I have sectioned falls definitely into the two groups. Without exception all the plants named *Zostera nana* on the evidence of the other characters, from places as far apart as Yarmouth, Weymouth and the Isle of Wight, showed the typical *Z. nana* stem whereas the material designated either *Z. marina* type or var. *angustifolia* had the typical *Z. marina* stem. Nor was there any difference in the arrangement of the tissues in thick stems up to 4 mm. in diameter, or in thin stems, even less than 1 mm. wide. There was some doubt as to the identity of some very young plants which had only a few very narrow leaves but on sectioning the stem it was quite simple to assign them to their respective species: in no case was the evidence of the fibrous tissue doubtful.

Correlated with this arrangement of the tissues was another character which was apparently constant for all the material examined. In the cortical cells of the stem of *Z. nana* there were numerous starch grains while in those of *Z. marina* and its variety *angustifolia* no starch grains could be seen. There are many grounds for suspecting that this character will be found not to be reliable or constant, yet it is remarkable that all the material I have examined should show this character consistently.

It may, therefore, be concluded that the stems of *Zostera marina* and *Z. nana* always show a characteristic difference in the arrangements of the fibrous bundles and all forms of the variety *angustifolia* have a stem identical with that of *Z. marina* L., type.

2. *Leaf.* The distinguishing feature of *Z. marina*, var. *angustifolia*, is the size of the leaf and, reading the brief descriptions in works on the British Flora, one would imagine that this plant occupies a position intermediate between the two species. This is hardly so, however, for, as mentioned above, all sizes of leaf between 4 mm. and 0.5 mm. wide may be found. Thus it is impossible to decide whether certain plants with leaves about 4 mm. wide should be considered as narrow-leaved forms of the type or broad-leaved forms of the variety. Similarly with the narrowest leaved forms, it is impossible on the size of leaf alone to distinguish specimens of *Zostera nana* and *Z. marina*, var. *angustifolia*, since undoubted examples of the former possess leaves up to 2 mm. wide, while plants with the stem and flower characters of the latter have leaves as narrow as 0.5 mm.

The veining of the leaves also shows similar variation. Typical *Z. marina* has 7 or 5 veins, 3 is the rule in the var. *angustifolia*, while *Z. nana* has 1 or 3 veins. The number of veins, however, shows no relation to the width of the leaf so that some plants with leaves 3 mm. wide and, therefore, correctly referred to var. *angustifolia* may possess 5 veins, while others of the same width have 3 veins. Similarly the smallest leaves of var. *angustifolia*, like *Z. nana* have only 1 vein. A further complication arises in the position of the lateral veins. In some 3-veined plants these are in the centre of the space between the margin and the midrib, whereas in other 3- or 5-veined leaves the veins gradually move towards the margin, and so do not remain central throughout the length of the leaf. Similarly the outermost veins may run into the margin thus making the lower part of a leaf 5-veined, and the upper part 3-veined!

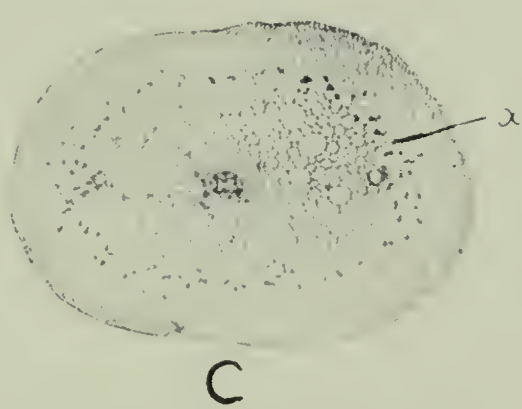
Ascherson and Graebner (1) describe the plant with leaves 3-4 mm. broad and possessing three equidistant veins as *Zostera marina*, var. *stenophylla*, but since the numbers and situation of the veins have proved to be so variable, a form based on such characters is obviously unsatisfactory.

Since the size of the leaf gives to the var. *angustifolia* its characteristic appearance it must follow that, as this size can vary within wide limits, so also does the appearance of the plant. As, also, there is a continuous gradation of size of leaf between that possessed by typical *Z. marina* and that possessed by the smallest forms of *Z. nana* and *Z. marina*, var. *angustifolia*, the range of variation of these latter forms is set artificially by the limits set to the range of variation of this same character in the type of the species. Such a variety appears, therefore, to be valueless from a taxonomic point of view.

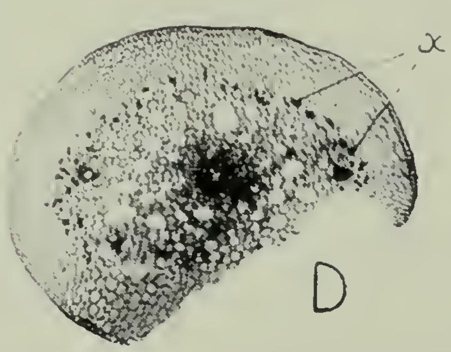
The variations in size shown by various populations of *Zostera* may be taken either as evidence of hybridisation and consequent segregation, or for the plasticity of the species under various conditions. Hence they are of no help in solving the problem of the status of these forms.

FIG. 2.

TRANSVERSE SECTIONS OF ZOSTERA STEMS.
x = fibre strands.



Z. NANA Roth, from Pagham Harbour.



Z. NANA Roth, from Ryde, showing the starch grains more clearly.

[illegible]

The *squamulae intravaginales* are small scale-like structures at the base of each leaf. They are rather difficult to count in dried material but, as far as can be ascertained, all the var. *angustifolia* material possesses the four scales of *Z. marina* and never the two scales of *Z. nana*.

3. *Inflorescence.* One of the most important and constant characters of *Z. nana* is the presence of scales on the spadix. Unfortunately, a large amount of material does not possess flowers so cannot always be taken as evidence for or against the status of the variety. Very small forms of var. *angustifolia* may be found with inflorescence and peduncle very much like that of *Z. nana* in size but, on examination, such forms are found to possess all the important characters of *Z. marina* including the absence of the scales.

4. *Seed.* Similarly with the seed, even fewer specimens can be found in which it is ripe enough to show the salient feature. All unripe seeds become brown, or black, and wrinkled, so dried specimens must be examined with due consideration.

5. *Chromosomes.* The only other character which might be of value is the number of chromosomes possessed by the various plants. Unfortunately, the material gathered in 1933 was unsuitable for ascertaining the numbers in the various species.

DISCUSSION.

From the above evidence it seems that *Zostera angustifolia* is correctly assigned as a variety of *Z. marina* while *Z. nana* is a distinct species which in size and form may, however, overlap certain forms of *Z. angustifolia*. From the taxonomic point of view the last named plant is not even a sound variety but rather, under that name, there are gathered together all the forms which do not fall in with our conception of the type described by Linnaeus. Since these forms show all gradations from the type, it is merely an artificial convenience to distinguish them at all.

The most remarkable point, however, is the present distribution of the various forms of the plant. There is no doubt that, during the last ten years, the large typical form has become very scarce and, in certain places where there are authentic records of this form being abundant in 1917, only the narrow-leaved forms can now be found. The type now seems to be confined to isolated and protected localities such as the salt lagoon at Walton on the Naze, or represented by a few plants scattered among the var. *angustifolia* forms, as at Ryde. On the other hand the var. *angustifolia* is now the commonest plant and has obviously been increasing for several years. *Z. nana* was apparently local and never very common nor in large quantity, and may still be found to the same extent.

At the moment, there is no evidence to show what has determined the decrease of the type, nor the advent of the very numerous "*angustifolia*" forms.

ZOSTERA MARINA × NANA.

The existence of a hybrid between *Z. marina* and *Z. nana* is a reasonable hypothesis since the two species, together with all the varying forms, occur in the same locality. In addition, the peculiar pollination of the plant would favour crossing. Long thread-like pollen grains are released into the water and these are caught up indiscriminately by projecting objects including the styles of the appropriate plants. If such pollen grains from *Z. marina* can fertilise the ovaries of *Z. nana* and *vice versa*, then hybrids should frequently occur. Yet, as far as can be ascertained, no var. *angustifolia* forms exist in herbaria or elsewhere, which show any of the salient characters of *Z. nana*, except thase of stature and size of leaf which, as indicated above, are not to be relied upon. The record of the hybrid appears in the *London Catalogue* (10) and Druce's list (6) doubtless through a specimen of Marshall's from Hayling Island which is labelled "*Zostera marina*, var. *angustifolia*" and "perhaps *Z. marina* × *nana* since both these species occur here." This, however, cannot be taken as proving the hybrid origin. There should be an intermingling of characters of the two parents or dominance of one parent linked with a constancy of form. Such, however, is not the case. In this, as in many other so-called hybrids, the only convincing method of proving their status is to produce the hybrid from the putative parents.

CONCLUSION.

Summarising, two species of *Zostera* undoubtedly exist in Britain both of which are polymorphic. These are *Zostera marina* L. and *Z. nana* Hornem.

Because of its greater abundance, the forms of *Z. marina* are more obvious than those of *Z. nana* and have been called *Z. marina*, var. *angustifolia* Roth.

This variety or collection of forms possesses the salient feature of *Z. marina* and none of those of *Z. nana* save the small size of leaf which is very variable.

Such forms are scarcely worthy of varietal rank.

It is not clear how these forms have arisen.

There is no real evidence that they are the result of hybridisation between the two major species, though this is possible. Even if hybridisation between *Z. marina* and *Z. nana* had not produced these forms it is quite likely that cross-pollination of the forms themselves has helped to produce even greater variety.

They may be forms induced by local environmental conditions, but cultivation of the plants can alone prove this.

There is no doubt that in 1933 these forms were more abundant than the type which, for some reasons, had been disappearing for many years. Hence there is a possibility that these forms have increased because they have survived a disease, but the disease would hardly have produced them in the first place.

ACKNOWLEDGMENTS.

My best thanks are due to Mr A. D. Cotton of the Royal Botanic Gardens, Kew; to the keeper of the Bailey Herbarium, Manchester, for loan of specimens, and to the very large number of botanists who helped by sending information about the state of *Zostera*.

A collection of plants on which this paper is based has been deposited in the Herbarium, Royal Botanic Gardens, Kew.

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THE CLASSICAL CARPEL AND RECENT ATTACKS.

JOHN PARKIN, M.A., F.L.S.

The Carpel of the Flowering Plants (Angiosperms) is regarded on orthodox lines as the equivalent of a leaf folded upwards and along the midrib, so that the margins of the two halves of the leaf cohere, enclosing a cavity, the ovary, in which are borne the ovules destined to become the seeds. The apical region of the midrib (dorsal suture) is fashioned into the pollen-receiving mechanism, the stigma. Primitively the ovules are considered to be arranged along the incurved cohering margins of the leaf, known as the ventral suture. Such an unmodified carpel is to be found in the follicle of the Ranunculaceae, *e.g.*, in *Caltha* and *Trollius*. An early type of flower was probably characterised by having an indefinite number of pluriovulate carpels arranged spirally on an elongated axis (receptacle). Though the British flora does not afford an example of this arrangement, a near approach thereto is seen in *Myosurus*, which has in fact numerous carpels borne spirally on a long receptacle, but these are only uni-ovulate. In some of the Magnoliaceae, however, the carpels so arranged may each have several ovules.

The whole of the female part of the flower is now generally spoken of as the gynœcium. The older term, pistil, is perhaps better relinquished as being somewhat confusing.* The gynœcium, then, is composed of carpels, just as we speak of the andrœcium as composed of stamens. From such a primitive gynœcium, as defined above, it is not difficult to derive the various forms which the female part of the flower has assumed in existing Angiosperms. The main steps taken in gynœcial evolution may be stated as follows:—(1) The shortening of the receptacle with a reduction in the number of the carpels and the substitution of a whorled for a spiral arrangement; (2) the cohering together of the carpels so as to form an ovary of several compartments (loculi), or, it may be, by further modification one of a single loculus; and (3) the hollowing out of the receptacle so that the carpels become sunk, as it were, in the floral axis with the ultimate production of the inferior ovary.

On the above view of carpel morphology certain difficulties in the interpretation of some advanced syncarpous gynœcia have arisen. These are to my mind of a minor character and do not render untenable the above conception of the carpel. For instance, much unnecessary controversy has been raised over such questions as to whether certain gynœcia may not be partly cauline in constitution, and certain carpels and ovules terminal rather than lateral in position. Positive answers to these queries have been supposed to invalidate the foliar conception of the carpel. It is not difficult to see how a syncarpous gynœcium can become partly cauline in composition through the adhesion of the concrescent carpels to that part of the receptacle which may be prolonged beyond the point of their attachment to the flower-axis. When the carpels in an apocarpous gynœcium are reduced to unity, as for example in the Leguminosæ, the single carpel may assume a terminal position through the growing point of the flower-axis ceasing further development after the emission of the carpel primordium, or, in other words, the growing point may be considered as wholly absorbed in the production of this single primordium. A similar line of reasoning can be advanced to explain the terminal position of the ovule which is to be found in a few syncarpous gynœcia with unilocular ovaries and solitary ovules, *e.g.*, in the Polygonaceae. For descriptive purposes we may apply such terms as cauline and terminal to certain carpels and ovules, at the same time recognising that these are not primitive but derivative positions arising from reduction, concrescence, compression or displacement.

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*The term, pistil, has been used in two senses, (1) for the whole female part of the flower when the carpels composing it are joined together (syncarpy) and (2) for each individual carpel when these are free from one another (apocarpy).

Another difficulty also over-emphasised is the presence in certain families of the so-called commissural stigma—the centering of the stigmatic surface over the ventral instead of the dorsal suture. This will be briefly referred to later.

In recent years the classical conception of the carpel and gynœcial morphology generally have been seriously challenged in more than one quarter.

CARPEL POLYMORPHISM.

Miss E. R. Saunders, in her genetical work on the Stock (*Matthiola incana*), came across some exceptional fruits which led her to a fresh enquiry into the composition of the Cruciferous gynœcium. The interpretation of this has in the past been a matter of some dispute as to whether two or four carpels are involved in its construction. Lindley, a century ago, put forward the 4-carpellary view in order to explain the presence of the commissural stigma. That astute botanist, Robert Brown, showed that this difficulty could be surmounted otherwise than by imagining the presence of an additional pair of carpels. Eichler accepted Brown's explanation, and ever since the 2-carpellary view has been the one usually assumed and taught. Miss Saunders has not only revived the 4-carpellary interpretation, but has made a determined attempt to revolutionise the whole domain of gynœcial morphology by postulating the presence in most gynœcia of one or two other types of carpel besides the conventional hollow or valve one set forth above (9). These supposed types she has named the solid and semi-solid respectively and her whole theory Carpel Polymorphism (10). This is based almost entirely on vascular anatomy.

The theory was launched by Miss Saunders ten years ago, and in a series of papers published since she has fairly well surveyed by means of it most groups of the Angiosperms, including both those of the Monocotyledons and Dicotyledons. Hardly a gynœcium escapes alteration, unless it be some of the Ranunculaceae and allied families with free carpels. Usually the number of carpels in the gynœcium is doubled—ordinary valve carpels alternating with solid or semi-solid ones. But in some of the Cruciferae she finds as many as sixteen and in Eschscholzia even twenty instead of the orthodox two! One thought the Leguminous pod would have been above suspicion and still held to be comparable to the single follicular carpel of the Ranunculaceae. Not so. As tested by the polymorphic idea it is considered to consist usually of two fused carpels—one solid and the other semi-solid. But it may be composed of more, *e.g.*, in *Arachis* (the ground or monkey nut) ten to twelve solid carpels are held to be present, corresponding to the similar number of parallel and equally strong vascular cords running the full length of the pod!

Miss Saunders put forward her theory with so much assurance and replied to her early critics with so much vigour that in some quarters a certain amount of sympathy was shown towards it. Not only seeing no firm basis for such a superstructure, but also fearing that on her authority carpel polymorphism might creep into elementary text books or be taught to students, I felt constrained to criticise the theory adversely as early as 1926 (8). Carpel morphology on orthodox lines is sufficiently complex without further complicating it by the addition of this polymorphic speculation, unless there are adequate grounds for doing so. Incidentally, the theory has also been opposed by Professor Eames (4), Dr Agnes Arber (2), and Professor Bugnon (3), and when it came up for discussion at the last International Botanical Congress held at Cambridge in 1930* no one except the originator herself spoke in favour of it. Quite recently it has been referred to as a theory in which "no one believes except its author."† Hence it would seem to be unnecessary to discuss it further except to say that it is totally lacking in a foundation based on comparative morphology, and relies almost entirely on the peculiar interpretation of one form of evidence—the vascular. To imagine nearly every stout fibrovascular cord running longitudinally as the midrib of a carpel is surely bordering on the fantastic.

A theory, even if proved unsound and so unacceptable, may yet have been of use in stimulating enquiry. This has happened to some extent in the case of carpel polymorphism. On the one hand, attention has again been turned to the composition of the Cruciferous gynœcium, and, on the other hand, to carpel morphology generally.

THE CRUCIFEROUS GYNŒCIUM.

Professor Eames, a specialist in plant anatomy, though strongly opposed to the polymorphic theory as applied generally, has by it been led to a re-examination of the Cruciferous gynœcium, and has become a convert to the 4-carpellary interpretation on novel lines (5 and 6). This gyœncium is held to consist of two whorls of two carpels each. Those of the lower (outer) whorl are of the usual valve pattern but sterile. Each carpel of the upper (inner) whorl has become so compressed as to lose its loculus entirely, and in the process the ovules have been, as it were, forced through the collapsing carpellary wall, and thus come to lie in the loculus of the carpel of the outer whorl. The author is careful to state that he believes this to have taken place in evolution (phylogenetically), since there is in development (ontogenetically) no actual evidence for it. Though Miss Saunders and he reach a somewhat similar conclusion regarding the constitution of the Cruciferous gynœcium, viz., the presence of a pair of sterile valve carpels and a pair of solid fertile ones, they do so in different ways. Miss Saunders's solid fertile carpel appears to have no past! She postulates its presence. As to how it arose she does not enlighten us. Eames *does* show how his solid carpel could have arisen, but its mode of origin, though ingenious, is so startling and unique as to make us sceptical, unless some clear ontogenetical evidence can be produced for it either from the Cruciferae or from one of the allied families. He does refer briefly to the Fumariaceae and the Capparidaceae, families in this circle of affinity, but the evidence he gleans from these is meagre and unconvincing. The Papaveraceae, a more promising family for supplying evidence, was not studied.

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*Report of 5th Inter. Bot. Congress, Cambridge, 1931, p. 295.

†*Nature*, November 25th, 1933, Vol. 132, p. 803.

Eames's theory is founded on the presence in the ventral suture (commissure) of the Cruciferous gynœcium of one or two inverted vascular bundles situated ventrally (internally) to the more prominent main bundle. The vascular supply of the follicle, generally regarded as the simplest type of carpel, consists of one median cord forming the midrib bundle and two lateral forming the marginal or placental bundles which supply the ovules. Owing to the incurving of the margins of the carpellary leaf the phloem and xylem of these placental cords become orientated in the opposite way to what they are in the midrib bundle. Such a vascular bundle is described as inverted. Eames sees, therefore, in the venation of the commissure the complete vascular supply of a valve carpel which has become so compressed as to have lost its loculus, to have squeezed out its ovules and so been rendered solid. It is putting, I think, too great a strain on the inverted bundle as evidence.

Owing to the carpellary make-up of this gynœcium being once more in dispute, Dr Agnes Arber, one of our leading morphologists, steps in and examines anatomically for her own satisfaction the Cruciferous flower (1). She comes to the conclusion that the 2-carpellary rather than the 4-carpellary theory should be retained as "an instrument of description," and adds characteristically:—"To ask how many carpels are involved in such a gynœcium is a purely scholastic question which can never receive an answer, because no answer exists." I am afraid I am not philosophically minded enough to appreciate to the full this qualification of her main conclusion. At any rate, we may at present rest content with the conventional view that the Cruciferous gynœcium is composed of two concrescent carpels with parietal placentation, and that the cross-partition (the replum) is of a secondary character arising from placental ingrowths. This interpretation is supported on comparative grounds. Similar gynœcia without or with partial partitions are to be found in the Capparidaceae and Papaveraceae. The commissural stigma usually present in the Cruciferae is not necessarily a difficulty in the 2-carpellary interpretation. It can be regarded as derived from the fused stigmatic margins of adjacent carpels. This can be readily followed in the Papaveraceae.

ACARPY.

The researches to which attention is now directed, whatever else they may lack, do not lack originality! Miss Saunders with her polymorphic theory generally increases the number of carpels in a gynœcium. Professor McLean Thompson, on the other hand, abolishes the carpel altogether! There is no such thing as a foliar carpel—at any rate in the two groups of Angiosperms he has so far investigated. Hence the term, acarpy.

Aroused by Miss Saunders's interpretation of the legume, he examines in great detail the development of the flower in the Leguminosae (16). Not only does he reject *in toto* the polymorphic idea but, instead of maintaining the current view, comes to the novel conclusion that the ovule-bearing organ of this order of plants is a flattened stem-structure—a phylloclade, in fact—the margins of which have curved inwards, enclosing the ovules. He imagines the primitive Leguminous flower to have terminated in a stalked and branched gynœcium bearing phylloclades with exposed ovules. A figure of this hypothetical flower is given (16, p. 43). The single pod of the Leguminosae has been reached through the reduction of the phylloclades to unity, the enclosure of the ovules and the suppression of the stalk (gynophore). Dr Newman, in a recent investigation of the Australian Acacias (7), sees no evidence for either the polymorphic or phylloclade view, and is in favour of retaining the classical interpretation of the legume as "a unitary foliar structure."

McLean Thompson's second elaborate study (17) has to do with the development of the flower in quite a different group of plants, viz., the Monocotyledonous order, Scitamineae, which includes the bananas, cannas, gingers, etc. These plants have a 3-locular inferior ovary. The gynœcium is consequently regarded on orthodox lines as composed of three united carpels sunk in the receptacle. Not so Thompson. If I understand him rightly he regards the ovules as originally borne directly on the hollowed out receptacle without any carpellary structure intervening. The styles with their stigmas are looked upon as independent organs which have arisen from sterilised stamens! A drawing is given of his imaginary ancestral Scitaminean flower (17, p. 108).

We have already seen to what apparent absurdities reliance wholly on one kind of evidence, the vascular, may lead. One is tempted to see in these conclusions of McLean Thompson something of the same character. He relies wholly on another kind of evidence, the ontological, ignoring the comparative. If the Scitaminean flower had been the only one extant, then the ontological method would have been about the only one available for its elucidation, and his interpretation might possibly have been entertained. Though the Scitamineae are a well-defined order of plants and not closely linked to any other, yet they belong to the Monocotyledons, in which can be traced the gradual evolution of a 3-carpellary gynœcium at first apocarpous, then syncarpous with a superior ovary, and finally syncarpous with an inferior ovary. Comparative morphology supplies no evidence for the origin of the style with its stigma from modified stamens as suggested by Thompson for the Scitamineae.

THE CAYTONIALEAN "CARPEL" AND THE "NEW MORPHOLOGY."

Dr Hamshaw Thomas, through his notable discovery of a new race of fossil plants—the Caytoniales—has recently attempted to evolve the Angiospermous carpel from the type of fruit-body there exhibited (12). In doing so he discards the classical conception of the carpel. It may be that Miss Saunders's polymorphic theory first suggested the speculative lines on which he proceeds. This, as already shown, usually postulates two carpels where, according to current notions, one only is considered to be present.

The fruit-bodies of the Caytoniales were arranged in pinnate fashion on the axis. The first step towards the Angiospermous carpel, Dr Thomas imagines, would be the reduction of such a fructification to a single opposite pair of fruit-bodies. At the same time he suggests that a length of axis persisted beyond the point of attachment of this pair of fruit-bodies. The next step postulated is the uniting of these two fruit-bodies with each other and also with the persistent sterile piece of axis. The structure resulting from this triple union is put forward as the equivalent of an Angiospermous carpel, the piece of axis incorporated representing the midrib. In these fruit-bodies of the Caytoniales the stigma considered to be present is not apically but basally situated, the whole having somewhat the appearance of an anatropous ovule with the stigma in the position of the micropyle. Consequently, to arrive at the recognised simplest type of carpel, the follicle, the composite structure, is regarded as having undergone orientation to the effect of bringing the stigmatic region into the terminal position.

It seems to me that a speculation as plausible, evolving the Angiospermous carpel from a fructification of the Caytonialean type, might be advanced on the supposition that each of these fruit-bodies was the equivalent of an anatropous ovule. In consideration of Dr Thomas's further discovery in the triassic rocks of South Africa of Pteridospermous plants with fruit-bodies similar in shape to those of the Caytoniales, but open and not stigmatic (14), it becomes legitimate, or at any rate plausible, to homologise the Caytonialean fruit-case with the Pteridospermous cupule. In the speculation now put forward it is suggested that the outer integument of the Angiospermous ovule may be the equivalent of this cupule. Imagine, then, a Pteridospermous megasporophyll bearing Caytonialean-like fruit-bodies to be reduced to a simple leaf structure with these bodies marginally borne, and then to enfold itself in the Angiospermous fashion, a carpel similar to a follicle would result except for the presence of a localised stigma. There would at first be a series of stigmata corresponding to the fruit-bodies (now the ovules) along what has become an incipient ventral suture. By the coalescence of these stigmata and the general extension of stigmatism to the carpellary margins and finally its gradual localisation at the apical region, a structure similar to a follicular carpel would be reached. A sessile stigma somewhat decurrent as a double line down the ventral suture would seem to be the primitive form among Angiosperms. In support of the possible homology of the outer integument with the cupule may be mentioned the fact that Angiosperms have primitively two integuments, while Gymnosperms (disregarding the Gnetales), Bennettitales, and Pteridosperms have only one. The fact that the fruit-bodies of the Caytoniales contain several seeds is no great bar to this speculation, as it is easy to imagine a reduction to one. Indeed, many Pteridosperms had only one seed to a cupule, including Dr Thomas's recently discovered triassic ones. Among Angiosperms there is some evidence, both comparative and developmental, for considering the curved (anatropous) ovule as primitive and the straight (orthotropous) one as derivative.

This, of course, is sheer speculation, but no more I think than Dr Thomas's. To be fair, however, some reference must be made to the evidence he brings forward for the compound nature of the carpel from a study of the venation of certain follicles and legumes (12). By a number of diagrams he shows that the vascular system connected with the marginal (placental) cord is marked off from that connected with the midrib cord. In fact, the latter may be unbranched, all the lateral veins arising from the two placental bundles. This is strikingly shown in the follicle of Caltha, where the lateral veins from the marginal bundles slip short a little distance from the simple midrib bundle. Dr Thomas suggests that the midrib venation corresponds to that of the axis, and the two marginal venations to those of the two fruit-bodies of the Caytoniales. The intimate union of these three originally separate structures has outwardly rendered unrecognisable the compound nature of the carpel, yet this is supposed to have been preserved internally in the venation. One questions very much whether venation can be used to this extent in phylogeny. The developing seeds naturally make the chief call on the conducting elements of the carpel, and the system of veining observed in these follicles may have become so established for this purpose and thus have little or no phylogenetic significance. Dr Agnes Arber in a recent paper (2) emphasises this and issues a timely note of warning regarding vascular evidence generally.

In a discussion entitled "The Old Morphology and the New," held by the Linnean Society of London in November 1932 (13), Dr Hamshaw

Thomas, the opener, laid stress on the possibility of the carpel and stamen of the Flowering Plant having no true homology with the foliage leaf at all. Accepting the attractive view that the large fern-like leaf has arisen through the limitation in growth of an arm of a forking thallus, then on *a priori* grounds it could be advanced that in one or more lines of descent the spore-bearing branches of the original thallus became segregated from the vegetative ones before these latter had assumed the character of foliage leaves. In such an event it would be morphologically incorrect to homologise modifications of these fertile branches with foliar organs. This apparently is Dr Thomas's contention. In other words, the spore-bearing branches may never have passed through the foliar stage. Dr Thomas is further of the opinion that the Angiosperms have descended from the Pteridosperms. If so, the evidence to be derived from this great plexus of extinct plants points rather the other way, viz., that the reproductive and vegetative organs were not evolved separately from a branching thallus. The primitive leaf, in fact, carried out originally both functions. That is to say the leaf had the same form whether it was fertile or not. We see this exemplified in the fronds of many existing ferns.

At the last (Leicester) meeting of the British Association, Dr Thomas endeavoured to strengthen his carpellary speculation by an appeal to the stigma, the nature and origin of which he discussed (15). The full paper is to appear this year in *The New Phytologist.* He lays stress not only on the double nature of the stigma, but also on the presence in the carpellary wall of a band of tissue which transmits the pollen tube. In many cases, he states, this band extends to the bottom of the carpel before spreading into the ovarian cavity. He argues from this that the transmitting tissue and therefore the stigma in the course of evolution must have originated at or near the base of the carpel and then later extended upwards. Such a conclusion naturally fits in with the connection he supposes exists between the Angiospermous carpel and the Caytonialean fruit-body, which has its stigma basally situated. The reasoning here thus seems a little forced.

On classical lines the double nature of the stigma presents no difficulty. It readily follows from the view expressed earlier in the paper that the primitive form of stigma among existing Angiosperms is the one which may be described as sessile and decurrent. Examples occur in the Ranunculaceae and allied families. The uppermost parts of both margins of the carpellary leaf are here stigmatic. This stigma has thus a mouth-like shape, the glandular margins forming the lips. Since the transmitting band runs along the ventral suture, it may possibly have arisen phyletically from stigmatic tissue at the time when the carpel according to theory was partially open with stigmatic margins running more or less the whole length of the carpellary leaf.

In conclusion, one may say that though these attempts to reach a new conception of the Carpel are welcome, none of them is likely to be accepted whole-heartedly. The time has not yet arrived when we can abandon with equanimity the classical interpretation. There is nothing at present very satisfying to put in its place. There is general agreement that the simplest and presumably the most primitive type of Angiospermous Carpel is the follicle. What immediately preceded this in evolution we do not know. Conventionally an open carpel with the ovules marginally borne is imagined, such as occurs at the present day in Cycas. The Cycadales, however, can hardly be considered as at all near the main line of Angiospermous descent. The Gnetales are usually held to be closer, but their gynœcium affords no clue as to the origin of the carpel. The Bennettitales with a fructification so suggestive of the Angiospermous flower had the female part so stereotyped and peculiar as to preclude drawing any homology between it and the carpel. In fact, it is in itself a morphological puzzle. To trace a connection between the Caytonialean fruit-body and the Angiospermous carpel needs, as has been shown, the ingenuity of a Hamshaw Thomas! So, in the words of the late Dr D. H. Scott, given during the recent Linnean Society discussion referred to above, we may say that "The old carpellary theory, so well re-stated by Goebel in his great 'Organography,' will probably continue to hold the field until more definite evidence can be brought against it" (11).

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CURIOSITIES OF PLANT LIFE.

An Address given to Tunbridge Wells Natural History Society by
Lt.-Col. A. H. Wolley-Dod.

It may come as a matter of surprise to many to learn in how many ways plants move, and in fact some of their movements seem to indicate some form of intelligence, though thinking without a brain would be a contradiction in terms. Plants cannot even be said to act by instinct. which itself is only a form of reasoning or acting on past experience.

I wish to direct your attention to the principal ones of these movements. It is not difficult by observation and experiment to show what all the movements are and even to discover the exciting causes, but to determine *why* they so move seems for the present to be beyond the wit of man to explain.

We will begin with the seed itself. Although it is not directly part of my subject I think you will all agree that it seems a miracle that so small an object as a seed should know, so to speak, that it has to grow into a definite species of plant. There is obviously something in its constituents that governs this, yet no chemical analysis shows its nature. In fact it is not the elements of which it is composed but their structure. or the way in which they are arranged which is one determining factor. and recent research has shown the first class importance of the chromosomes, microscopic organisms within the cells. These exist in all living matter, animal and vegetable, and in certain definite numbers and grouping, which are constant within each species. Each chromosome governs some feature of the plant or animal; thus one may determine the colour, another the scent, another the size and so forth. A knowledge of the normal numbers and groupings in a species enables scientists to determine the origin of hybrids, and this is especially useful in the genus *Rosa*, perhaps our most difficult and most hybridised genus. But this investigation can only be made in a chemical laboratory with the aid of a microscope, and has the somewhat disconcerting result that plants may be proved to be hybrids of known parents though their vegetative characters give no guide whatever to the systematist or field botanist, who does not go further than a pocket lens.

When the seed germinates it produces a radicle or embryo root. and a plumule or embryo stem. It is a matter of common knowledge that the former grows downwards and the latter upwards, but the reason for this is not known. It is said to be a *property* of the radicle to grow downwards as if gravity were a controlling factor. but to put it unmathematically, gravity means weight. but weight alone certainly is insufficient to account for the downward force. which has been measured and is found to be at least a quarter of a pound and perhaps considerably more. It does not matter which way a seed is planted in the ground. The radicle may emerge at the top but will immediately turn downwards. I cannot trace that the experiment has been tried but it is quite probable that if a growing seed were to be subjected to centrifugal force the radicle would develop outwards and the stem inwards. [It transpired during the remarks after this lecture that this experiment had been successfully carried out, and that both root and shoot grow in any direction indifferently.]

As the root advances the part immediately behind it expands. This is due to the absorption of moisture by the growing tip, and this expansion exhibits a surprising force, more than eight pounds in one case, causing it to enlarge the hole for the passage of the machinery for feeding the stem with water, &c. In order that the downward thrust of the growing tip shall not cause the cotyledons of the seed to be forced out of the ground, minute hairs are developed on the sides of the rootlet and these are directed backwards and so resist the tendency. It must not be supposed that the root itself advances through the soil. Only the tip apparently does so by the continuous building up of new material at the apex, which is formed into a sheath of specially strong cells.

But although this desire, so to speak, to grow downwards is surprising and inexplicable, the movement of the root tip is more wonderful still. Its progress is not straight downwards but sinuous, in a sort of corkscrew movement. The diameter of the spiral formed by the root tip of a bean has been measured and found to be about 2mm. The advantage of this movement is that the growing tip can, as it were, sample the soil through which it grows, and in doing so it has been observed that moisture is a governing factor in determining its direction. Experience shows that the better soils usually contain humus, which is hygroscopic and the moisture which it attracts also attracts the root tip.

In addition to the downward and gyratory movement of the tip there is another which it makes. It is natural to suppose that if the tip meets a solid obstacle it will turn aside to avoid it, but this movement is not confined to mere stoppage of its progress. If even the side of the root comes in contact with any obstruction not directly impeding its progress it will turn away from it, and it has been shown that the turning of the growing tip when it meets an obstacle is not entirely due to force of circumstances but to the inherent nature of the root to turn from any obstacle.

I will not now speak of the functions of the root, but pass on to other movements shown by plants.

Apart from normal growth and the movements due to wind, the leaves, twigs, and the ends of stems are constantly in motion. This motion, which is called circumnutation, is a movement up and down or from side to side, usually in an ellipse. The time occupied in completing a cycle of such movement varies. It may be twenty-four hours or only one hour, depending on the species, its age, &c. It is most noticeable in the seed leaves, which usually move up and down only, their direction varying about 20 degrees above and below the horizontal, though sometimes considerably more, and with a tendency to erection at night. The mature leaves move in irregular ellipses and by irregular stages, sometimes moving by jerks. This movement is quite independent of the diurnal movements so commonly observed when plants go to sleep. Excepting the special movements to be described later, they do not appear to be of any special importance to the plants, but there is little doubt that one gain to them is in the better circulation of the sap, just as exercise in an animal assists in the circulation of the blood.

But there are special movements other than these periodic ones which are of obvious value to the plant.

Carnivorous plants have special movements in order to entrap the insects on which they feed. A common example is the sundew, the leaves of which are covered with numerous gland-tipped hairs or tentacles. So soon as an insect settles on the leaf of one of these species the tentacles begin to bend over it. The time for this movement varies with the circumstances. It may begin in a very few seconds, and it has been observed that the tentacles close much more quickly over a live insect than a dead one, also over a thin-skinned than a thick-skinned one, the period varying from one to four or five hours. The inward movement is accompanied by an increase in the sticky secretion, which also becomes more acid, thus the insect is soon smothered in the juices and digested by the acid, so as to be absorbed by the plant. That the juices of the insect are actually absorbed by the plant may be shown by placing minute particles of some chemical on the leaves, which soon cause discolouration in their internal parts. Moreover, since the plant depends for its living on the insects it captures, its root system is not more developed than is necessary for its anchorage to the ground and not for the absorption of food material. [It was afterwards pointed out that this statement is not wholly in accordance with the facts.] The insect thus captured may be killed in a quarter of an hour and may take a few hours for its digestion, after which the tentacles slowly return to their upright position ready for another victim. It has been observed by experiment that the inflection of the tentacles over an inorganic object is much less definite than over an organic one, and this seems to indicate some power of discrimination. For example they are not affected by water but if milk be applied to them they commence to inflect at once. This, and many other movements seems to indicate the presence of some form of intelligence in plants, but it is not necessarily present. It is an inherent property of the organs, the exact nature of which is not understood. It indicates a sensory system, but not a governing mind.

There are other carnivorous plants which exhibit various movements, differing in details, for example *Dionæa muscipula*, the Venus's Fly-tray, Sarracenias or Side-saddle plants, *Nepenthes* or Pitcher plants, etc., but I will not go into details of these now.

A familiar instance of the movement of plants is seen in their heliotropism, or tendency to turn towards the sun, or at least to the light. It may be noticed that there are very few exceptions to the property of turning towards the light which is possessed by leaves, in order to get the maximum of sunlight. This is also aided by their shape, designed so as not to shade one another. They are thus able to absorb the maximum of carbonic acid so esential to their growth. Even here nature steps in to save energy, because it is found that insect-eating plants, which do not require carbonic acid for their sustenance, do not possess this property of turning their leaves towards the light, nor, as said before, is their root system more than just sufficient to anchor them to the ground and not to absorb nourishment therefrom.

But this tendency to seek the light is hardly a case of true heliotropism, such as may be seen in a sunflower, which always turns its face towards the sun. This is a classic example, but all plants exhibit the same tendency to a greater or less degree. The flowers always tend to face the sun in its path across the sky, thus performing a partial twist upon their stems, returning after dark to their normal position. I have not been able to ascertain whether flowers in latitudes where the sun is above the horizon for twenty-four hours will ultimately twist their heads off, but it is not likely since the sunlight must be strong in order to produce this heliotropism, which does not take place for some time after sunrise and ceases before sunset.

I have seen a striking effect of heliotropism in a field full of *Dimorphotheca pluvialis* in South Africa. The ray florets of this composite are pure white on the face and dull purple at the back. If they are looked at with one's back to the sun the field appears to be dazzling white, but when facing the sun hardly any flowers are visible at all. The same effect may be seen in a garden.

There is another form of heliotropism seen chiefly in subtropical climates where the leaves will turn their edges to the sun when its light is very intense, while some will keep their leaves with their faces permanently parallel to the meridian, doubtless for a similar reason, namely, to check the evaporation from their surfaces. An example of the latter is seen in the Compass Plant of the American prairies, *Silphium laciniatum*, the young leaves of which lie with their edges north and south, thus indicating the points of the compass.

Examples of apheliotropism, or turning from the sun, are much less common than the converse. This must not be confounded with geotropism or a tendency to turn towards the earth, exhibited by our *Trifolium subterraneum*, *Arachis hypogaea*, the Monkey nut, *Cyclamen* species, etc., which turn their fruiting peduncles to the ground, and which movement is found not to be affected by light.

Perhaps the most important instance of special movement in plants is exhibited by climbers, which is really an effect of circumnutation. They may be considered under four classes, Twiners, Climbers by tendrils, Scramblers,. and Root climbers.

The most important class is that of Twiners, or plants which have the property of winding spirally, or more correctly helically, round a more or less vertical support. The growing end of the stem of such plants is subject to a well developed circumnutation, such as has already been defined. If quite free to move it will describe a circle of which the end of the stem is the radius, which may be 2 or 3 feet long. In an experiment carried out by Darwin the length of the generating vector or arm was about 2½ feet, thus describing a circle of 5 feet diameter. The circle was completed in 5½ to 6 hours, which means a movement of about 32 inches per hour. The rate of revolution depends on the species and is influenced by its age and climatic conditions, and some species will rotate clockwise, others counterclockwise, this being quite independent of the sun or the hemisphere in which the plant grows. Incidentally no reason has been discovered for this predilection of certain species, any more than for many other vegetable phenomena.

Now when this revolving stem meets an obstacle it responds to the check just as the growing root tip will do, but in a converse manner, since it will turn towards, instead of away from, the obstructing influence as the root does. If the obstacle be an upright post, the stem will wrap itself around it, while at the same time it grows upwards, thus forming a helix, which may be clockwise or counterclockwise accordng to the species. It is more informative to define the direction thus, or to say with or against the sun, than to say from right to left or conversely, since that depends on whether you consider the near or the far side of the post up which the stem twines, and is often to my mind wrongly defined. It is more common for plants to twine counterclockwise than the reverse, e.g., scarlet runners, convolvulus, etc., while hops, black bryony and others twine clockwise, i.e., with the sun. Some species will twine either way indifferently and occasionally some twine first one way and then the other, the idea about this last movement being that the continuous twining in one direction puts a torque on the stem, to which the species objects, though why all species do not show the same objection is one of the many unanswered questions in the habits of plants.

The time taken to complete a revolution of the stem varies, observations of different plants showing that it may be anything from 1¾ hours to 18 hours, and probably the limits are wider. The ratio between the rate of volution and the rate of progression of the apex will, of course, determine the angle of the helix. In some cases, as with the honeysuckle, the constricting force of the stem is apparently so great that it embeds itself deeply on that of the plant up which it may be climbing, but it is inaccurate to attribute this to the constricting force of the point. The real cause is the expansion of the stem by its normal increase after the twining is complete.

The second class of climbing plants contains those which do so by means of tendrils or by the petioles of the leaves. The tendrils, which are only modifications of leaves, or an expansion of their midribs, behave in a similar manner to the growing tips of the stems; that is to say they circumnutate and are sensitive to a touch which causes them to bend towards the object which touches them. The circumnutation may take place over a circle of 15 inches or more in diameter and it may take from one to several hours to describe the circle. On meeting an obstacle they almost instantly begin to bend towards it and ultimately encircle it. If the object which incites the bending be removed the movement will cease, though the general circular motion of the whole end of the tendril will continue. Experiments have shown that a tendril will respond to an exciting cause for many times, but gradually the tendency to curl weakens and eventually ceases altogether. In training my Sweet peas it has appeared to me that only the young tendrils have the property of climbing. If a leaf with an old tendril be adjusted to its support it refuses to clasp. I must admit, however, that I have not experimented on this point enough to establish it as a fact.

It will be noticed that when a tendril has encircled a support it hardens and strengthens to a remarkable degree, which is obviously necessary for its function of supporting the weight of the plant.

Tendrils will attach themselves to objects by other methods than by twining alone. Some have little hooks at their extremities which tend to insert themselves into crevices in walls or the bark of trees, which it will be seen affords an example of apheliotropism. Sometimes instead of hooks the ends of the tendrils swell out so as to fill the recess. This swelling does not occur until the tendril has entered some crevice where it can fix itself. Another method of obtaining support is by the formation of sticky discs at the tips of the tendrils, such as may be seen in the Virginia Creeper. Here again the discs are not formed until the tips touch something. The sticky secretion hardens and serves as a very strong glue. It has been found that a single tendril disc can support a weight of two pounds, while if there are several branches the capacity for supporting weight is correspondingly increased.

Climbers which are not furnished with tendrils may obtain support by means of their petioles, which behave in the same manner as tendrils do, and exhibit the same tendency to induration as them, which is not developed until an object has been encircled. The Clematis is an example of this kind of climber.

The next class of climbers is the Scramblers, and these form a considerable proportion of our hedgerow plants, exhibiting their tendency to scramble in various ways. Thus the common Goose-grass is furnished along its stems with reversed bristles, so that while the stem can readily grow upwards it is by no means so easily drawn downwards. It is noteworthy that the stems of such plants are destitute of any of the stiffening materials which non-climbing plants have. Nature here exhibits her conservative tendency, though in many other respects she seems to be extravagantly wasteful. Roses may seem to be an exception to this weakening of the stem, but such is only the case in Dog Roses, which grow chiefly in hedges, the prickles of which are obviously intended to support the stem. Other species although they have prickles, inhabit open places and so do not use their prickles for support and have stiff self-supporting stems.

The last class of climbing plants is a small one, namely the root climbers, of which the Ivy is a familiar example. I would remind you that the processes thrown out by the stem, and which attach themselves to a support, are not roots in any sense of the word, since they have no function in the nourshment of the plant, hence "Root-climbers" is a misnomer. An interesting point is that when the ivy stem has reached the top of the tree or other support, it ceases to throw out these processes, since they are no longer required, the free ends of the stem being without them.

A different sort of movement takes place in sensitive plants. I have already told you how the leaves and stems of all plants are continuously subject to circumnutation, and how climbers and their tendrils will respond to a touch in order to make them function, but in sensitive plants this tendency is developed to a specially high degree, and it is not always very obvious what benefit the plants derive from the motion thus acquired.

The most familiar example is the Sensitive Plant, *Mimosa pudica*, a native of South America. It is a species with bipinnate leaves, having a pair of pinnae standing at right angles and furnished with numerous pairs of pinnules, and a second pair is developed later beyond them on the common petiole. A very slight touch will cause all the pinnules to rise and touch one another by their faces while the two pinnae approach so as to become nearly parallel instead of at a right angle to the midrib. This movement takes place very quickly and may be caused even by a puff of wind. After remaining closed for some time the pinnae and pinnules very slowly regain their normal position. Intense sunlight as well as darkness have the same effect as a touch, but in prolonged darkness the leaves will ultimately unfold.

A more striking example is the Telegraph Plant of Brazil, *Desmodium gyrans*. Here the leaves have one large terminal and two small lateral lobes. The lateral leaflets or lobes are continuously in up and down motion, the opposite leaflets moving in opposite directions. The terminal leaflet oscillates more slowly from right to left and also up and down. If these movements are retarded in any way they are renewed with greater velocity when set free. The movements are continuous, both in daylight and darkness and are not affected by touch. They are visible to the eye without the necessity for measuring them. They will continue for about 24 hours on a stem which has been severed from the main plant.

Apart from its habit of going to sleep, our own Wood Sorrel shows signs of irritation if roughly handled, closing its leaves as in sleep. The stamens of various plants exhibit a certain amount of irritability. Thus if the point of a pencil be inserted into the flower of a *Mahonia* the stamens will instantly bend forward against the pistil. I have said that many of these movements seem to be meaningless but it is not so in the case of the Mahonia. It might be supposed that it would assist self-fertilisation, but the contrary is the case. It has been observed that when an insect enters the corolla, which it does between the stamens and the pistil, the former at once bend over the back of the insect which thus receives the pollen from the anthers, and this is carried on to the stigma of the next flower visited, thus effecting cross- not self-fertilisation.

London Pride, Parnassus Grass, French Willow herb and other species exhibit some similar movement of their stamens, but in these cases the movement is spontaneous and is not effected by insects. In many of the Orchids the pollinia have a sticky disc to which they are attached at the base. An insect on entering a flower comes in contact with this sticky disc which adheres to its head so that it draws out the pollinia as it leaves the flower. This phenomenon may be seen by the insertion of the point of a pencil. After withdrawal of the pollinia the stipe on which they are borne immediately bends forwards so that they are in a horizontal position, and come in contact with the stigmatic surface of the next flower entered by the insect.

The so-called sleep of plants is known to the most casual of observers but the term is a misnomer since there is no analogy between the sleep of animals, which is for their rest, and that of plants which is for their protection. For this reason the word nyctitropism is used to mean what is popularly called sleep, the word meaning turning or folding at night. Plants which are subject to sleep will close or turn their leaves so that their faces are not exposed to the sky, thus saving the chilling effects of radiation at night. It has been demonstrated that when leaves are prevented from assuming the sleeping attitude they may even be killed by cold due to radiation.

The seed leaves of many plants exhibit a tendency to erect themselves in the young state, thus partly closing over the young shoot for its protection, but it is not all plants which possess this property. The sleeping attitude may be assumed by the bending of the petiole so as to turn the edge of the leaf upwards, as in the garden Nasturtium. The Telegraph plant already mentioned has an exceptional behaviour. Only the terminal leaf lobe turns downward and sleeps at night, while the lateral lobes continue to oscillate just as much at night as in the daytime. Examples of sleep of plants may be seen in Wood Sorrel and Dutch Clover.

The opening and closing of flowers is a different movement from that of the sleep of leaves. Many species will close their corollas or turn them downwards on the approach of and during rain, which is in order to protect the pollen from being washed away. But some have the habit of opening and closing at fixed hours. I should say " more or less " fixed, because apart from rain, the time is affected by wind, light, and temperature, but normally a definite time can be assigned to the closing and opening of many species, so that botanists have constructed what is called a " Floral Clock " based on the times, but it would not be safe to rely upon this for catching a train. We all know the Evening Primrose which opens about sunset, and many of the Catchflys somewhat later, and it is noteworthy that the flowers of the latter which are strongly scented when open have no odour in the daytime. Those of you who know *Crepis taraxacifolia* may have noticed that a field which is yellow with its flowers in the morning looks quite bare in the afternoon, and the common Goat's-beard, which closes before 12 o'clock, has consequently received the name of John-go-to-bed-at-noon.

I have, up to the present, confined my remarks to the movements of plants, a subject on which I might have given you a much longer discourse by giving you details of the experiments and researches of Darwin, but these would be rather of the nature of statistics, and therefore much duller than the conclusions which only I have dealt with. Consequently I have come to the end of my subject but not to the end of the statutory time.

There are very many other interesting phenomena connected with the vegetable kingdom, but I will confine my concluding remarks to two.

The behaviour of plants in the struggle for existence gives rise to what J. G. Taylor calls " Robbery and Murder " which indeed some of it seems to be.

An ordinary climber may be regarded as a plant which does not take the trouble to stand up by itself but uses the stems of others in order to get its head into its place in the sunlight. In many cases, in fact in most of the British climbers, this may be looked upon as a sort of companionability, or the helping by one plant to allow another to grow, but it may develop into a more serious form of parasitism. The common Ivy may choke a tree, as we have seen discussed in " The Times " lately. There seems to be diverse opinions as to the harm it does, or how it does it, but it certainly is not a true parasite, which lives on the sap of its host. Nor does it usually kill other plants by strangulation, but rather by suffocation, surrounding it so closely with a dense covering of leaves that it deprives it of light and air, and therefore may eventually kill it. In which case it ought to be classed as a murderer and not as a mere robber.

Another climber, which may become a murderer, is our Honeysuckle. This may sometimes entwine a tree or shrub so tightly as to choke it, though I have not often seen cases of absolute murder. It usually only embeds itself deeply into the stem up which it climbs. But in the tropics there are many murderous climbers which kill trees by strangulation.

In Britain cases of robbery are common enough, and some of these may become instances of murder. Mistletoe is a well-known robber. It is a true parasite, living on the sap of its host. If a branch of tree on which it grows be examined its stems may be found under the bark far from where it grows into the air. This sucking the juices of its host cannot do the latter any good, but I do not think any harm accrues to a tree even when badly infested with Mistletoe. May this be because it is only a partial parasite, growing green leaves by which it absorbs and breaks up carbonic acid, and therefore does not take a very heavy toll of its host; but in tropical countries again Mistletoe species may be very harmful, one in Brazil being capable of destroying whole fields of Coffee plants or Oranges.

The Broomrapes are a more indolent class of robber. These form no green leaves, but live entirely on the sap of their hosts. I am not aware of any serious harm coming to plants on which they grow in Britain, but in other countries they may become a serious pest. In the south of Spain a fine species with blue and white flowers, *Orobanche crenata*, may take possession of a whole field of peas or beans and utterly destroy the crop, and there are other species hardly less destructive. Dodder, of which three species are natives of this country, is not above reproach, though the two commonest, *Cuscuta epithymum* and *C. europaea* do not do much harm. But one which not many years ago was much commoner than it is now, was a deadly foe in clover fields. I refer to *C. trifolii*, which would kill square yards of the crop at a time.

We have many other parasites or partial parasites, which are disliked by farmers rather because they extract goodness from their hosts or from the soil rather than absolutely destroy them. Such are Yellow Rattle, Euphrasia or Eyebright, Cow-wheat, etc., while several others are suspected of parasitism and therefore deserve to be classified as robbers.

The last subject I shall bring before you is the dispersal of seeds. The most obvious means of dispersion is by a pappus or crown of hairs which occurs in a great many, but by no means all Compositae, as in thistles, dandelions, etc. The pappus may consist of a mere ring of hairs or bristles, the chief function of which is to prevent the extrusion of the seed from the ground as it germinates, but the more fully developed ones are a sort of parachute which may be erected on a stalk or stipe. The rays may be of simple or of feathered hairs. The pappus of the Goat's-beard is a beautiful object of plumose hairs. The pappus enables the seed to be borne on the wind, often to very considerable distances, spreading the seeds all over the country to the detriment of agriculture. Here I may remark that one of our worst agricultural weeds, the creeping thistle, is said not to form seeds, on the common principle in nature that plants which reproduce themselves from running roots, do not take the trouble to make seeds, the Couch Grass is another example of this. I am unable to verify this from my own observations and have certainly found well formed seeds on both these species, though in small quantity.

Other British genera which have a pappus to their seeds are the Willows and Willowherbs. The similarity is in the English names only, the genera being very widely distinct, though perhaps the Willowherb derived its name from the similarity in the seeds. The wide dispersion of these species, so that they both appear on building sites in the heart of London, is accounted for by the easy dispersion of their seeds by the pappus.

Another method of atmospheric distribution of seeds is by means of wings on them or on the capsules. Winged seed pods, called *Samarae*, are seen in the Maple, Ash, Elm, etc. They are of course much less efficient than a pappus but enable the plant to scatter its seeds more widely than those with no such appendage.

Spines, which may or may not be hooked at the tips, are a very common means of distribution through the agency of furred animals or the feathers of birds, and one may add the clothing of men. Medicagos may be a positive plague to those who cultivate animals for their hair or wool, becoming firmly entangled in that so as to be most difficult to comb out. We all know what it is to walk through woods or fields in the autumn with burdocks, goosegrass, houndstongue and many other plants growing in them, so that we thus become unwilling distributors of their species. In tropical countries these burrs or hooks assume formidable proportions, making a sort of grapnel, which fixes itself to the noses of sheep and cattle, thereby being carried about, but thus stamping themselves as murderers, since the animals are liable to die of starvation.

Another interesting method plants have of dispersion of their seeds is by the elastic opening of their seed vessels. The common Balsam is a familiar example, the capsules opening with a spring, which projects their seeds for some feet. The Common Hairy Bitter Cress is another example. It is one of the most troublesome weeds to get rid of in a garden. It germinates and ripens its seeds several times in a season, and when touched the pod springs open and there are a prospective couple of dozen plants in the place of one. Although small and probably taking very little nourishment out of the soil, it makes up for that by its immense numbers. The Witch Hazel expels its seeds with such force as to give one quite a smart blow in the face, and lower in the vegetable scale are some of the Bird's Nest fungi, which shoot their seeds six or eight inches into the air.

Seeds are also dispersed by flotation in water. The coco-nut will float from one island to another, and the *Nelumbium* or Egyptian Bean has a floating capsule in which the seeds are embedded. When they germinate they form a sort of cornucopia, until the dissolution of the capsule enables them to take root.

A curious story attaches to the fruit of the Monkey Pot, a species of *Lecythis* in Brazil, though it is not strictly a case of dispersion of seeds. The receptacle is like an urn with a lid, which becomes detached when the seeds ripen, so as to allow them to escape. After it is empty the inhabitants use it as a trap for monkeys. They fill it with sugar which is very attractive to those animals. They insert a paw and grasp the sugar but the orifice is not large enough to allow them to withdraw their closed paw, and they have not the sense to open it. Consequently they have to walk away with the capsule attached to their foot, and thus their movements are so hampered that they are easily caught. It is said that only young and inexperienced monkeys can be caught in this way, giving rise to the saying of a cautious person that "He is too old a monkey to be caught by a Cabomba."

There are many other ways in which seeds are distributed which I will not detail to you, but will conclude with one very interesting example in the case of an Indian species of *Loranthus*, of the Mistletoe Order. The fruit, as is usual in the order, has a viscid pulp surrounding the seed so that it adheres to whatever it falls upon. When it germinates the radicle at first grows out and when it has grown to about an inch in length it developes upon its extremity a flattened disc. The radicle then curves about until the disc is applied to any object that is near at hand. This you may notice is a case of circumnutation. If the spot upon which the disc has fastened is suitable, the germination continues and no locomotion takes place, but if the spot should not be a favourable one the germinating embryo has the power of changing its position. This is accomplished by the adhesive radicle raising the seed and advancing it to another spot, or to make the process plainer the disc at the end of the radicle adheres very tightly to whatever it is applied to, the radicle itself straightens and tears away the viscid berry from whatever it has adhered to and raises it in the air. The radicle then again curves, and the berry is carried by it to another spot where it adheres again. The disc then releases itself and by the curving about of the radicle is advanced to another spot where it again fixes itself. This may happen several times so that the young embryo still within the seed is moved about till it finds a place to its liking. It seems to select certain places in preference to others, especially leaves. The berries on falling are almost certain to alight upon leaves, and although many germinate there, they are sometimes observed to move from the leaves to the stem, and finally fasten there.

THE BRITISH SPECIES OF MYRIOPHYLLUM.

W. H. Pearsall.

We have three species of this genus in Britain and as they are frequently confused or found impossible to determine by members, the following notes may be helpful and may also save time both to collectors and myself. The species vary greatly in their size and characters according to the conditions under which they grow—the depth of water and nature of the bottom being of the greatest influence. Like most flowering aquatics these plants send up their flowering spikes above the surface of the water and these are mainly wind-pollinated. This usually occurs in June, July, or August. During a wet summer it frequently happens that the water-level is much above the normal during the flowering period and the spikes fail to reach the surface. All flowering aquatics are able to "stretch" their spikes (or peduncles) considerably to meet this emergency—often twice their normal length—so that it behoves us to accept all dimensions given in descriptions with all due reserve. In spite of this ability to lengthen the spike it frequently happens—especially in lakes—that plants such as *Myriophyllum* and *Potamogeton* are quite unable to elevate their flowers above the water-surface at such flood periods and depend entirely upon special resting or winter-buds for their propagation. These are surrounded by closely packed leaves; in late autumn they drop off and sink into the semi-liquid mud where they remain quiescent until the following spring.

All three species of *Myriophyllum* have unisexual flowers--i.e. the stamens and pistils are in separate flowers but on the same (monoecious) plant. Usually the upper flowers are staminate and the lower pistillate in the same spike. Occasionally the intermediate flowers are 2-sexual (perfect or hermaphrodite) and in that case the plant is polygamous.

Myriophyllum is sometimes confused with the somewhat similar *Ceratophyllum*, but the leaves of the latter are quite stiff, do not collapse when taken out of the water, are not pinnately divided but two or three times forked, and the segments are distinctly toothed along their margins. To those interested in microscopic forms of plant or animal life the leaves of *Myriophyllum* are among the most prolific sources of interesting material.

Little dependence can be placed upon the number of leaves in a whorl, in the determination of a species. This often varies on the same plant. In *M. alterniflorum* it may be 3 or 4, in *M. spicatum* more usually 4 (but may be 3 or 5 on occasion) and in *M. verticillatum* it is more often 5 than fewer. The length of the leaves is also variable but those of *M. verticillatum* are the longest, those of *M. spicatum* next in length (often from 1-3 cm.), and those of *M. alterniflorum* are rarely more than 1 cm. long.

When flowers are present determination is easy, when absent it is difficult. In the former case the following key may be used:—

MYRIOPHYLLUM.

1. *All flowers in whorls*—often reddish. 2
   Uppermost flowers solitary—alternate—yellowish. M. ALTERNIFLORUM.
2. Uppermost bracts *entire* (or merely dentate)—*shorter* than or only slightly exceeding the flowers. .... M. SPICATUM.
   Uppermost bracts *pinnatifid, much longer than the flowers.* .... M. VERTICILLATUM.

I. M. ALTERNIFLORUM DC. This species is more common in the lakes and tarns of hilly districts in the North than elsewhere but is very generally distributed in streams and ditches throughout Britain. It possesses a slender stem and leaves—in whorls of 3 or 4—with very fine capillary segments. The leaves are much shorter than those of the following species and have finer segments. The spike is very slender, lax, short, few-flowered, usually curved at the top but *always hooked in bud.* The upper flowers are staminate, solitary, alternate (or occasionally opposite), and springing from the axils of bracts which are *entire* (or merely denticulate or serrate) and *shorter than the stamens.* The lower flowers are pistillate, yellowish, solitary or in alternate groups of 2-4 in the axils of pectinate bracts resembling small leaves. The fruit is slightly smaller than that of *M. spicatum*, ovoid-conical, truncate.

II. M. SPICATUM L. A species more common in the South than in the North but like the preceding very widely distributed throughout Britain at somewhat lower levels. It usually retains its green colour throughout the winter. It is rather more robust than the preceding, and possesses a more rigid stem and leaves. The latter are more distant, usually in whorls of 4 (rarely 3 or 5), longer and with longer segments than those of *M. alterniflorum.* The spike is always *erect in bud*, elongate, interrupted, possessing many dull reddish flowers arranged in whorls, provided with bracts shorter than or only slightly exceeding the flowers, entire or merely dentate, the upper often ovate. The upper flowers are staminate with narrowly oblong anthers on short filaments and with minute sepals often deep purple. The lower flowers have roundish closely sessile stigmas *not elongate.* The whole spike is not leafy as is the case in the following species. The fruit is sub-globose but less so than in *M. verticillatum* being often slightly oblong, a little longer than broad and sometimes irregularly tuberculate, 2-3 mm. long.

M. VERTICILLATUM L. is the largest and rarest species of the three and recorded only for about half the number of vice-counties of the two preceding species. Its distribution extends from Cumberland in the North to Cornwall in the South but between these extremes there are many counties from which it has not yet been recorded. It is extremely variable according to the ecological conditions under which it grows and usually is not green in winter. The leaves are usually long

(1 in.-2 in.), in whorls of 5 (only rarely 4) with opposite ± distant capillary segments. As in all species of *Myriophyllum* these segments are entire, smooth—although often mud-encrusted—and collapsing when taken out of the water (cf. *Ceratophyllum*). The spike is very long (10-20 cm.), much interrupted and leafy to the summit where it is often terminated by a tiny crown of empty bracts. The flowers are normally reddish, all in whorls arising from the axils of leaf-like bracts many times longer than themselves. Even the upper bracts are pinnatifid and much longer than the flowers. The uppermost flowers are staminate, with greenish-yellow boat-shaped petals about 2 mm. long, large yellow anthers and pale green to pinkish sepals. The lower flowers are pistillate with stigmas rather *elongate* and recurved. The fruit is small—to 3 mm. long—sub-globose, olive-green and rounded on the back. The var. *pectinatum* DC. is merely an ecological state induced by shallow water conditions. It has the habit of *M. spicatum*, a rather slender spike with much shorter bracts whose lobes are closer together than in normal *M. verticillatum*.

ORCHIDACEAE.

Mr P. M. Hall and myself have completed our survey of the British distribution of *Himantoglossum* and *Aceras*, and the results are summarised in our papers in this Report. We are greatly indebted to all those who so readily contributed to make that survey so complete.

We are now undertaking a similar investigation into the past and present distribution of the MILITARES section of ORCHIS—*O. simia*, *militaris*, *purpurea*, and *ustulata*. We shall be very grateful for your co-operation in supplying localities, counties, collectors' names and dates for any herbarium specimens or recent stations known to you. Notes on any observed increase or decrease of a species in a given area are of the greatest value. In the case of Orchid species which are in danger of extinction we publish no list of actual localities—but we shall include a further paper giving the vice-comital distribution of these species in next year's Report.

W. H. PEARSALL.

DESIDERATA.

At the last Conversazione, 15th November 1933, some extremely beautiful water-colour paintings of British wild flowers by Miss Lucy Burton were exhibited and greatly admired as being not only of high artistic merit but also botanically accurate and true to life. Over 800 similar paintings have already been completed with a view to their ultimate publication, but the following species—numbered as in Fitch & Smith's Illustrations—are still required, and we should be grateful to any member who could send a fresh and typical specimen of any of them—carefully packed in a tin box—to Miss Lucy Burton, Stott Park, Lake Side, Ulverston, Lancs.

2. *Thalictrum alpinum*. 13. *Ranunculus ophioglossifolius*. 19. *R. flabellatus*. 43. *Roemeria hybrida*. 48. *Matthiola incana*. 59. *Arabis alpina*. 71. *Sisymbrium Irio*. 87. *Alyssum calycinum*. 94. *Camelina sativa*. 99. *Teesdalia nudicaulis*. 106. *Lepidium latifolium*. 110. *Isatis tinctoria*. 116. *Reseda alba*. 117. *Helianthemum guttatum*. 118. *H. canum*. 124. *Viola arenaria*. 129. *Dianthus prolifer*. 130. *D. Armeria*. 131. *D. deltoides*. 134. *Silene acaulis*. 138. *S. gallica*. 145. *Lychnis Viscaria*. 146. *L. alpina*. 162. *Cerastium alpinum*. 199. *Althaea officinalis*. 230. *Genista pilosa*. 235. *Medicago falcata*. 245. *Trifolium incarnatum*. 247. *T. stellatum*. 250. *T. medium*. 253. *T. Bocconi*. 258. *T. resupinatum*. 284. *Vicia lutea*. 297. *Lathyrus niger*. 301. *Spiraea salicifolia*. 304. *Dryas octopetala*. 311. *Rubus Chamaemorus*. 321. *Potentilla rupestris*. 368. *Sedum sexangulare*. 370. *S. reflexum*. 378. *Saxifraga Hirculus*. 382. *S. cernua*. 459. *Cornus suecica*. 467. *Lonicera Caprifolium*. 469. *Linnaea borealis*. 487. *Valeriana pyrenaica*. 499. *Aster Linosyris*. 501. *Erigeron alpinus*. 508. *Gnaphalium luteo-album*. 515. *Inula salicina*. 520. *Xanthium Strumarium*. 534. *Diotis maritima*. 549. *Senecio paludosus*. 551. *S. palustris*. 552. *S. campestris*. 557. *Saussurea alpina*. 577. *Centaurea solstitialis*. 613. *Lobelia urens*. 616. *Phyteuma spicatum*. 631. *Arctostaphylos Uva-ursi*. 636. *Menziesia caerulea*. 643. *Pyrola uniflora*. 679. *Gentiana nivalis*. 710. *Asperugo procumbens*. 721. *Orobanche elatior*. 723. *O. caerulea*. 727. *Verbascum Blattaria*. 729. *V. nigrum*. 730. *V. Lychnitis*. 731. *V. pulverulentum*. 733. *Antirrhinum Orontium*. 737. *Linaria supina*. 817. *Teucrium Botrys*. 977. *Damasonium stellatum*. 980. *Stratiotes aloides*. 981. *Malaxis paludosa*. 982. *Liparis Loeselii*. 987. *Cephalanthera ensifolia*. 988. *C. rubra*. 992. *Epipogum aphyllum*. 995. *Spiranthes Romanzoviana*. 1008. *Habenaria intacta*. 1039. *Lloydia serotina*. 1045. *Scilla autumnalis*. 1055. *Allium triquetrum*.

ZOSTERA MARINA IN BRITAIN.

A. D. Cotton, F.L.S.

During the past three years a remarkable reduction in the growth of *Zostera marina* has taken place on the Atlantic coast of North America. Practically the whole coastline from New Brunswick to North Carolina is affected and in some areas the reduction amounts to its total disappearance. Observations made in Western Europe show that a somewhat similar situation exists. The affected areas include the North and West coasts of France, South coast of England, Holland, parts of Denmark and Sweden. Making allowances for certain exaggerated reports as to the extent and suddenness of the reduction, there can be no question that during the last few years *Z. marina* has very largely disappeared over large areas on both sides of the North Atlantic. The cause of this remarkable biological phenomenon has not so far been determined. French authors have attributed it to a bacterial pathogen, but American pathologists have not been able to confirm this.

In a preliminary survey of the *Zostera* situation on the British coasts, we have been impressed with our ignorance as to the ecology and biology of the various forms which occur. Two species of *Zostera* exist in this country, *Z. marina* and *Z. nana*, and a third form is recognised and known as *Z. marina*, var. *angustifolia*. The latter figures largely in all reports as to the disappearance of *Z. marina*. It has been regarded either as a narrow-leaved form of *Z. marina* or as a hybrid between *Z. marina* and *Z. nana*. In certain localities where the normal *Z. marina* has disappeared (e.g. Abbotsbury, Dorset) the ground has apparently been colonised by the narrow *Z. marina*, var. *angustifolia*. Being a much smaller form the "drift," which is used for various purposes, is perhaps only 1/10th of that washed up by *Z marina*. The substitution of one form for the other raises in acute form the question of its taxonomic status. If it were a narrow-leaved form of *Z. marina*, it is remarkable that a variety of a species should survive where the normal form has been exterminated, and if it were a hybrid it would afford an interesting case of a natural hybrid succeeding where one of its parents has locally completely disappeared. In many localities various intermediates are found and it was subsequently ascertained that some of the records received as to the flourishing condition of *Z. marina* concerned in reality the variety *Z. angustifolia*. Published records from other countries are also unreliable owing to this form not being clearly defined.

Certain data are available as to the biology of *Z. marina* as it occurs in the Pacific through the researches of W. A. Setchell, but no detailed observations have been made in England. As is well known, the genus *Zostera* is of special interest in that it possesses filiform pollen grains, and some interesting accounts of its pollination have been published.

Various details, however, require to be filled in, such as the method of discharge of the pollen grains from the anthers, whether pollination takes place at the surface of the water, or in the water, and the development of the germ tubes from the filiform pollen grains. No observations have been made on the fertilisation mechanism of the supposed hybrid or on *Z. nana*, which occurs at a higher level on the mud flats and which, presumably, sheds its pollen only during high tides. Apart from the biological investigations referred to below, it is most important for a comprehensive biological and ecological examination of all the forms to be initiated.

It is satisfactory to be able to record that Mr T. G. Tutin has commenced an investigation on the *Zostera* problems at the laboratory of the Marine Biological Association at Plymouth. Though he will naturally include survey work over a wide area, his task is essentially an intensive investigation of the problems as presented in the Plymouth district and research into the various problems involved from as many angles as possible supported by all the unrivalled resources of the Plymouth laboratory. Mr Tutin will be interested to learn of any observations on the subject which members of the Botanical Exchange Club may have made, or may be able to make during the coming season.

CREPIS BIENNIS L. IN YORKSHIRE.

The above is the title of a paper published in *The Naturalist*, p. 51, on 1st March 1933, by Dr Eric Drabble, and which is reproduced herewith.

" With the question of the presence of *Crepis biennis* in Yorkshire has become involved the identity of certain plants gathered near Bridlington by Messrs Lawson and Flintoff and others. As one of those whose misfortune it is to have been drawn into the discussion, a short statement from me may, perhaps, be permitted. In 1929 the late Dr G. C. Druce sent me a sheet labelled ' *Crepis nicaeensis* Balb., N. Yorks. June 1929, ex R. J. Flintoff ' for my determination. The plant clearly was not *nicaeensis*, as the hairy inner surface of the phyllaries at once showed, but the specimen was in such extremely poor condition and so incomplete that no determination was possible. A plant, however, was raised from a fruit of this specimen, and this formed a good rosette in 1930 and flowered in 1931, but it was apparently self-sterile, as no fertile fruits could be obtained. This plant was similar to a *Crepis* found by me in that year at Freshwater, Isle of Wight, and was identified as *C. oporinoides* Boissier, Voyage botanique dans le Midi de l'Espagne.

I have seen the specimen from Allerston, which Mr Flintoff says is now ' at rest ' in the Herbarium at Kew. It would have been well could that rest have remained unbroken, but it has been disturbed by Mr Flintoff himself in *The Naturalist*, November 1932, p. 318. The specimen as I saw it was an incomplete plant without ripe fruit, and, in my opinion, was not one on which a determination could firmly be based for purposes of record.

In July of the same year (1932) Mr Lawson sent me plants with ' Bridlington ' as the only indication of locality. One of these was distinctly hairy, but the rest were apparently large forms of the same plant as that sent me by Dr Druce and grown by me from seed. There were no ripe fruits, but I was told that if I would only wait patiently they would ripen off. My previous experience with the cultivated plant led me to watch this with interest and it was no surprise to find that this did not happen, thus confirming my impression that the plant was self-sterile.

Later in the same year Mr Lawson sent what he stated to be fruiting heads of a large *Crepis*, presumably from the same locality. The pappus was well formed, but there was not a single fertile fruit. These specimens had markedly hairy peduncles and involucres, and were probably *biennis*. Thus from North Yorkshire I have seen plants which I regard as (1) *biennis*, (2) *oporinoides*.

Firstly with respect to *biennis*. This is recorded in J. G. Baker's ' Flora of North Yorkshire ' as ' In Cleveland in cultivated fields, Great Ayton, W. Mudd !' This, with Baker's confirmatory ' !,' should be a satisfactory record, and my experience with the North Yorkshire plants offers no challenge to Baker's mark of exclamation. It is probably thoroughly justified, and Mr Flintoff's ambition to furnish a record 'without the addition of a note of exclamation' is surely a very strange one.

The other plant, *C. oporinoides* Boiss., is, in my opinion, merely a variety of *C. biennis* (see *Journal of Botany*, October 1932, p. 280), and I shall not be at all surprised should it be found in other parts of the country. That it has until this year (1932) been recorded, so far as I know, only from the Sierra Nevadas in Spain may well be due to lack of extensive and intensive study of *C. biennis* throughout its geographical area in this country and on the Continent. It does not seem to me likely that *oporinoides* has had a separate distribution from *biennis sensu stricto*. It may well be a mutational form which may crop up anywhere, and its occurrence at Freshwater—a *biennis* area—may be significant.

During the coming season plants should be gathered in North Yorkshire by some responsible collector and the same material be circulated to all those who have previously tried to furnish help, and here it should be noted that fruiting heads must be sent if determination is to be secured. The plants ought also to be observed in cultivation, and to this end ripe fruits must be collected on the spot, where pollination from plant to plant may have taken place. That *oporinoides*—though probably self-sterile—does produce fertile fruit in Yorkshire is shown by my success in raising the plant from seed. Meanwhile, may not all of us who have been drawn into this discussion agree to let the matter rest until we have all examined adequate and identical material."

On 3rd July 1933 I received through Mr R. J. Flintoff a box of *Crepis* and an accompanying letter received from Mr A. E. Greaves, of Goole. From the letter I gathered that Mr Greaves had collected the plants in the "neighbourhood of Howden" and thought them *C. biennis*. I replied to him that I did not think they could be referred to that species, and sent him authentic examples of *C. biennis* for comparison. I further stated that I would keep the plants and subsequently send them to my friend Dr Drabble who was unfortunately ill at the time. I deeply regret that he never saw them. As these plants came from Howden (S.W. of v.-c. 61) over 30 miles south of Allerston (v.-c. 62) referred to in the above paper, they have no direct bearing on the point at issue, and are only mentioned to further suggest that there are other species besides *C. biennis* in Yorkshire.

Among the late Dr Drabble's letters on this subject are some which the writers now probably wish had never been written, but there are two which in justice to my friend, in accordance with one of his last-expressed wishes, and in the interests of scientific accuracy should be published. They are from Prof. E. B. Babcock, Professor of Genetics at the University of California and author of the standard Conspectus on this genus. The first is dated 16th March 1933, to Dr Eric Drabble.

"Dear Sir,—On a herbarium sheet from Kew carrying a specimen of *Crepis oporinoides* Boiss., I have found a very interesting note from you to Mr Cotton under date of May 21, 1932. From this note I learn that you have been growing this rare and interesting species for several years. As I am trying to bring to completion a monograph on the *Crepis* of the world and have long wanted to obtain living material of this species, naturally I am greatly interested to learn that you have it under cultivation.

I have gone over the material on this Kew sheet very carefully, comparing it with my notes, fragments and drawings from the type of the species in the Boissier herbarium, and I am satisfied that your identification is correct. There are a few minor variations from the type in your material but none of much importance. Of course I should be still better satisfied if there had been a mature achene in the packet on this sheet but the immature ones there compare very well with the mature ones from the type. If it is impossible for you to send me any live roots I hope you can send me some viable seeds. These can be sent in a letter directly to me and no special permit is required for importation of any seeds.

Thanking you in advance for your kind co-operation.

Very sincerely yours,

E. B. Babcock, Professor of Genetics."

A further letter is dater 16th May 1933.

"Dear Dr Drabble,—Acknowledging your kind note of April 17. I am sorry to hear that you have been ill and I am looking forward to hearing from you further concerning material of *Crepis oporinoides*. I am very sorry that the original collector has got some of the material mixed and sent out under other names.

Sincerely yours,

E. B. Babcock, Professor of Genetics."

All who knew Dr Drabble's painstaking efforts to arrive at the correct determination of any plants submitted to him will welcome this further corroboration of his opinion from Prof. Babcock.

W. H. Pearsall.

A VISIT TO THE DAGENHAM DUMPS IN SEPTEMBER 1933.

SIR ROGER CURTIS.

These notes are compiled from the humanistic standpoint; they make no claim to be scientific. Rather the purpose is to show the value the ordinary member may obtain from membership of a Botanical Society. I take it that the vocation of the ordinary member, both here and hereafter, is scarcely to promulgate micro-species. These must be left to more expert workers. Ours may be the province to admire and possibly to envy, it is scarcely ours to compete. None the less the ordinary member is not denied the thrill of Botany, that glow of inward satisfaction which comes after our day's labour in the field when confronted with new plants. Such was my experience after some hours' roam amid London's unsightly and malodorous rubbish colonies at Dagenham. I was fortunate on this occasion to have the company of Mr R. Melville who skilfully elucidated for me the mysteries of its alien flora. It was pleasant to behold a *Gossypium* species after being clothed for so many long years in cotton underwear. How many Botanists have been privileged to see this plant of first-class economic and historical importance?

Among edible plants we were rewarded by seeing such foreigners as Maize, several Millets (*Panicum miliaceum*, *Setaria viridis*, *S. italica*), and *Sorghum halepense*. A fine crop of tomatoes, much prized and guarded by the Dagenham natives, was also on view. Among more luscious plants we saw specimens of the water-melon and marrow, though hardly fit for the table I admit.

For toxic medicinal plants we were amply contented by a sight of *Hyoscyamus muticus* and *Datura Stramonium*. The latter, indeed, was most plentiful, forming in one place a veritable thicket. And what a glamour there is about the tribe of Solanaceae! No other Natural Order appears to possess such mysterious fascination over the hearts and bodies of man.

The more conventional inhabitants of rubbish heaps were well represented by the usual Sisymbrium tribe (*S. altissimum*, *S. orientale*): the dingy Chenopods by *C. rubrum*, *C. ficifolium*, *C. Vulvaria*, *C. polyspermum*. Atriplices were not to be denied a footing and we saw *A. deltoidea* and *A. littoralis*. *Diplotaxis tenuifolia* made a handsome showing and its flowers gave out a pleasant fragrance in contrast to the melodorous *Chenopodium Vulvaria*.

Among the really handsome plants we saw must be reckoned the vigorous growth of *Aster Tripolium*, a really creditable British plant. Less attractive were *Mercuralis annua*, *Erigeron canadensis* and *Senecio viscosus*. Only one alien shrub was seen, but it alone was worth the journey, *Colutea arborescens*.

My first reflections were (1) how dull and dingy much of the British flora is compared with its alien cousins, (2) a good tramp in the country, even under wet skies, produces a glow of physical well-being which intellectual interests alone can never yield. It is the supreme privilege of the field botanist that these two satisfactions are his to enjoy. A Club, too, surely exists that its members may join forces on such expeditions and so add human comradeship to other gains.

NOTES ON THE ORCHIDACEAE OF KENT.

W. H. PEARSALL.

As I am now resident in Kent I have recently been afforded exceptional opportunities for acquiring first-hand knowledge of many of the rarer species of this Order by their examination *in situ*. In addition to this I have acquired a mass of authentic information from the members of the Society and others as to their distribution, and decrease or increase.

On May 18, Mr H. D. Stanley and I explored the district N.E. of Ashford and saw *Orchis purpurea*, *Ophrys apifera*, *O. muscifera*, *O. aranifera*, *Anacamptis pyramidalis*, *Aceras anthropophorum*, *Cephalanthera grandiflora*, and several of the Marsh Orchids. We were also fortunate in finding a colony of *Pyrola minor* in flower at this early date in a sheltered situation of sunny aspect.

During the following week Mr P. M. Hall asked me to join him at Wye for a week-end. We went over most of the ground I had traversed ten days before, but even in that short interval there was a marked falling-off in the numbers of the more conspicuous species. Where previously I could have easily gathered 50 specimens of *Orchis purpurea* we now had difficulty in discovering half a dozen. The area of our investigations was therefore extended, especially to the south-east, and we were rewarded by the discovery of several additional species. It is perhaps necessary to say that we were not "collecting," but a list of the species actually seen—on May 27-28, 1933—will be of value as a record:—*Cephalanthera grandiflora* (in quantity), *Orchis purpurea* (in several places), *O. Morio*, *O. ustulata*, *Platanthera chlorantha*, *Anacamptis pyramidalis*, *Aceras anthropophorum*, *Ophrys apifera*, *O. muscifera*, *O. aranifera* and *O. arachnites*. Of the last-named we saw some half-dozen flowering specimens *in situ* and met an entomologist with 2 more in his button-hole. He said they were Bee Orchids and there were plenty in the neighbourhood! However, as he kindly offered us the flowers we were grateful for their gift.

About a fortnight later I spent an afternoon with Dr H. Gray, of West Malling, studying these species on the downs N.W. and N. of Maidstone. In both vice-counties we saw large numbers of *Cephalanthera grandiflora* under the identical ecological conditions found previously in the S.E., but in neither instance under Beech. *Aceras an-*

thropophorum and *Gymnadenia conopsea* also, were frequent in each v.-c. In v.-c. 16 only there were some exceptionally fine colonies of *Herminium monorchis* and, of course, *Ophrys apifera*.

I am deeply grateful to my friends for their kindly offices in affording me so many opportunities for the study of these fascinating and thought-compelling plants in their natural haunts. In each district of the county I was much struck by the general similarity of the special habitat conditions necessary for each species. However, the danger of generalising from insufficient data was again apparent for Mr Hall was more impressed by the dissimilarity of some of the habitats with those favoured by the same species in Hants and its neighbouring counties. However, it was obvious that a wide and intimate knowledge of the individual ecological conditions under which each species grows is the best guide to its discovery.

The Lizard Orchid eluded us and I have yet to see it growing in its natural surroundings. However, through the willing co-operation of members and others I have been able to compile a complete list of its recorded Kentish stations and also of its vice-comital distribution elsewhere. According to a letter in the "Times" during the summer of 1933 a specimen had been discovered near Sevenoaks and the fortunate finder rushed into print with the statement that this species had been practically extinct in this country for nearly a hundred years. However, the facts do not support him. The Lizard Orchid has been seen in some part of Kent alone nearly every year of this century—it was seen at 4 other stations in Kent during 1933, also in E. Sussex and N. Somerset. During the past 10 years—only—it has also been recorded for Surrey, Hants, Wilts, Bedfordshire, Cambridge, Herts, Lincs and E. Norfolk; and seen growing in other counties by botanists who wisely wish to protect it. We trust that any individual who makes a further discovery of this plant will "blush to find it fame."

BEGINNING THE STUDY OF GRASSES.

W. H. PEARSALL.

The study of Grasses is commonly neglected because of its difficulty, but this is very largely due to the absurd confusion of names used by various authors in describing the parts of the flower-spikelets. This short article is written, by request, solely for beginners working alone, and is an attempt to deal with all the difficulties they have already encountered or may ultimately meet. In commencing the study of Grasses it is unwise to select those in which the flowers are not fully opened and anthers displayed. When this later stage is reached half the difficulties of determination disappear. There is the same difference in appearance between the early and later flowering stages of most grasses as between those of a closed and open umbrella, and most of the book illustrations show only the later stage. Having waited, therefore—say, till June—we select a large grass whose spikelets are on spreading branches and whose flowers are well opened. These spikelets are simply small clusters of flowers and their protecting scales. They are usually oval or lanceolate in outline and vary in length from 2 mm. (*Agrostis*) to 20 mm. (*Bromus*), without including the awn. With the aid of a small pair of scissors cut off a single spikelet and place it on a post-card. We are now about to dissect the spikelet and a word of caution is necessary as to its perverse tendency to fly off into space during the process! By means of the small blade of a pen-knife, a large needle and a lens, make out the following parts. At the bottom of the spikelet where it joins the stalk are two boat-shaped *glumes*, unequal in size, opposite each other, hinged together and tightly clasping the base of the spikelet. With the help of knife and needle remove them. If your blade is well sharpened this is most easily and quickly done by cutting across their hinged base. These are what Bentham and Hooker (and many other authors) call the " empty glumes " or the " outer glumes," but modern authors simply " glumes." As a general rule, each spikelet possesses a pair of these glumes and usually they are not awned. (There are exceptions to these two statements, but they are very few, the only one worthy of mention being that of *Anthoxanthum odoratum*—Sweet-scented Vernal-grass—whose spikelets possess 2 pairs of glumes, the inner pair being awned).

Inside this pair of glumes—now removed—are the flowers, one or several. The flowers of a grass have no petals and consist mainly of a tiny ovary (with the 2 delicate plumes of the stigma at its apex) and 3 slender stamens. These flowers have no glumes, but each flower is enclosed between 2 *pales*, the outer and the inner. These pales are very similar in appearance and form—" boat-shaped "—to the discarded glumes but are usually larger, more delicate and often possessing awns at their tips. The larger outer pale—or palea—(O.P.) is of the utmost importance in the determination of the grass, so the greatest care must be exercised in its examination. The inner pale is smaller, more delicate and sometimes very difficult to see, but at this stage we shall rarely require to detach it.

Here it will be necessary to deal at some length with the great difficulty experienced by botanists who possess one or more of the following British Floras—Bentham and Hooker, Babington, Watts, Johns or Hayward. Most often a student possesses two of these and finds much difficulty in making their descriptions of the flowers of Grasses agree. The "outer pale" is termed the "flowering glume" by several of these authors, and by Babington the "lower pale." *These three terms—outer pale, flowering glume, and lower pale—are simply different names for the same thing.* The term "pale" means in Johns the inner pale, but in Hayward the outer pale—*e.g.*, 4 times on p. 235. This is sufficiently confusing to those who use these two authors in conjunction, but by no means the end of the story, for we find in Hayward's Botanist's Pocket Book no fewer than 5 different terms used for the outer palea:—

outer pale	p. 237, *Trisetum flavescens.*
lower pale	p. 237, *Avena fatua* and *A. strigosa.* (For *A. pubescens* "outer pale" is used).
pale	p. 235, *Aira caryophyllea* and *A. praecox.*
flowering glume ...	p. 235, *Apera Spica-venti* and *C. epigeios.*
glume	p. 237, *Deschampsia caespitosa.* p. 249, *Brachypodium sylvaticum* and *B. pinnatum.*

As the glumes of none of the last three species possess awns this use of the term "glume" is very misleading, especially as the same term is correctly used on the same page!

It is to be hoped that the foregoing explanations will enable members to more easily follow the descriptions given in their Floras, and at the same time to accustom them to the use of modern terms in general use.

Having thoroughly grasped the fundamental fact that the "glumes" are only to be found at the base of each spikelet—and not at the base of each flower—and that above them are the pales, we are in a position to take a further step and ascertain how many flowers each spikelet contains. It may perhaps help us to recognise the very similar glumes and pales by remembering that they, together, form the "chaff" of the miller. (L. *palea* = chaff). It is necessary to know the number of flowers in each spikelet before we can follow the book descriptions or use a Key. As each flower is enclosed between a pair of pales if we count the number of pairs we know the number of flowers. In actual practice it is much easier simply to count the larger outer pales—*e.g.*, 4 outer pales = 4 flowers. Do not include the glumes, it is better to remove them before commencing to count.

We have deliberately chosen a grass whose flowers are arranged in a loose branched panicle, as we consider this type of grass presents to the beginner less difficulty than the spike or spike-like type, and therefore the student feels that he is making satisfactory progress from the start. He will soon notice that in many cases the outer pale (O.P.) ends in a long bristle, but in other cases it is simply acute or even blunt and jagged. This long bristle is the "awn" and it needs very careful examination to find out where it is attached to the pale. Although it appears to be merely a prolongation of the apex of the pale—and therefore a "terminal" awn—it is more often attached to the back of the pale, or even to its base. Insert a needle between it and the pale to discover its point of insertion (attachment). If inserted near the middle of the back of the pale, the awn is "dorsal," and if starting from the bottom of the back, it is "basal." It is often so closely pressed against the back of the pale that botanists hastily conclude that it is "dorsal," but by inserting the needle between the awn and the back of the pale it is possible to work it right down to the base, proving that the insertion of the awn is "basal."

Even more common is the mistake made by looking casually at the spikelets as a whole and because no protruding awn is visible, concluding that there is none present. This is one of the reasons why so many beginners fail to recognise *Aira caespitosa* (*Deschampsia caespitosa*)—a common tufted species found on wet grassland or the borders of woods. In this grass the outer pale possesses a very fine hair-like and straight basal (or almost basal) awn about as long as the pale and therefore not protruding beyond it. The glume hides this awn from view and only by the preliminary removal of the glumes is it likely to be seen—and even then, it is so fine as to be often missed except by the discerning!

The awn of grasses may be very slender or quite stiff, smooth, or very rough, twisted, straight, or bent in the middle ("kneed")—often both twisted and kneed. These characters are very important in the determination of species. Some genera (*Poa*) never possess awns, while many others are at once recognised by their awns. Another prominent character in the grasses belonging to some genera—*e.g.*, *Avena*, *Aira*, *Arrhenatherum*, and *Phalaris*—is the presence of a tuft of hairs at the outer base of the pales. These hairs are situated between the glumes and the pales. They are seen directly the glumes are removed and distinguish these genera from others (*e.g.*, *Bromus*) which possess no basal tufts of hairs.

We may now examine the grass selected. If there is only one perfect flower in each spikelet the grass will probably be either a species of *Agrostis*—a very delicate grass—or *Melica uniflora*. All the species of *Agrostis* may be known by their very slender spreading branches, tiny spikelets and glumes longer than the pales they contain. *Agrostis vulgaris* With. is a characteristic grass of heaths and commons. Its panicle is very fine and graceful—Fine Bent-grass—and its leaves are narrow and possess a *short* blunt ligule. Another common species found in meadows, marshes, woods or by the wayside is *Agrostis alba* L. (Fiorin). Its ligule is *long*, erect and rounded at the apex. There are other species and varieties for which a Flora must be consulted.

Melica uniflora is found on shady banks, especially those near woods, and can be distinguished at once by its few chocolate-coloured spikelets on long slender branches. The O.P. is awnless, broad, rounded at the apex and 5-7 nerved. This grass flowers about June and is one of the easiest with which to commence the study of grasses.

If our selected grass (with one-flowered spikeklets) is neither a species of *Agrostis* nor *Melica*, it may possibly be *Milium effusum*—a grass found in damp shady woods—or *Molinia caerulea* (Purple Moor-grass) found on moors or in marshes, but avoiding those on limestone or chalk.

For grasses whose spikelets contain 2 or more flowers it will be best to use a Key, such as that of Bentham and Hooker's British Flora. In doing so, it is necessary to remember that we need only commence at No. 31 and that the "flowering glumes" are the "outer pales." The lengths of the spikelets are given in "lines;" this is an old-fashioned method of measuring length—one line equals one-twelfth of an inch or roughly, 2 mm. Modern books give these lengths in millimetres.

It will be noticed that this Key (from No. 31) is in 2 parts: 31-39 dealing with grasses the pales of which are *awned*, and 40-49 including those having *awnless* pales. Of the latter we need only concern ourselves with No. 48—*Poa* and *Festuca*—at this stage of our study. Both these genera are very common and differ chiefly in their outer pales; those of *Poa* are obtuse or only sub-acute at the apex and possess *no awns or awn-points*. The outer pales of *Festuca* are very much more pointed and end in a *short awn or awn-point*. Having decided to which genus our grass belongs it becomes necessary to ascertain its species. Here, unfortunately, we shall get little assistance from the Key to either *Poa* or *Festuca* in Bentham, although the descriptions of the species may be helpful. We need only consider *P. annua*, *P. pratensis*, *P. trivialis*, and *P. nemoralis*.

P. annua is a little tufted annual, flowering nearly all the year round and abundant on gravel paths and waste places everywhere. Its panicle is triangular in outline, often somewhat 1-sided, and 1-2 inches long. The leaves are flat—often puckered—limp, dull pale-green in colour, and glabrous. The O.P. is 2-3 mm. long, 5-nerved, with membranous margins above.

P. pratensis (Smooth-stalked Meadow-grass) is a perennial species which has a creeping root-stock with runners. Its leaves are variable, short or long, with nearly parallel margins suddenly narrowing at the apex to a blunt point. The ligule at the base is short and blunt. The O.P. is blunt, and often ragged at the apex. This species is abundant in meadows and by the wayside.

P. trivialis (Rough-stalked Meadow-grass) is also a perennial, abundant in moist places. It may be distinguished from *P. pratensis* by the absence of runners, a general roughness of stem, leaves broadest at the base and gradually tapering to a rather acute point. The ligule of the uppermost leaf is long, acute and glossy. The O.P. is acute at the apex.

P. nemoralis (Wood Meadow-grass) is a tufted or slightly creeping perennial only found in shady places—woods or banks shaded by high hedges. It is much less frequent than the preceding species, and much more slender and delicate in its rather drooping panicles, often rather close, seldom very spreading.

The genus *Festuca* is very similar to *Poa* and needs very careful examination of the points of difference before it can be confidently distinguished. Its spikelets are often slightly larger than those of *Poa* as they contain more flowers. The outer pale always ends in an awn or awn-point. There are only 2 species of this genus which are likely to be gathered, as both are very common in moist situations. *Festuca elatior* (Tall Fescue) is commonly found on damp clay soils and in wet marshy places. It may be from 3-5 feet high. Its leaves are long, dark-green, firm and keeled only at the base. If held up to the light white lines will be seen between the ribs. The sheaths at the base of the stem are red or pink. The flowering panicle is large, spreading and rather drooping at the top. The O.P. is 5-9 mm. long, boat-shaped, round-backed and with 5 faint nerves, the dorsal (middle) nerve ending in an acuminate point or very short awn.

F. pratensis (Meadow Fescue) is similar but much smaller—18 inches to 2 feet high. It is most commonly found in moist pastures on good soils, or in damp grassy places by the wayside. Its panicles are less branched and less drooping than those of the preceding species. Its leaves, also, are limp and not firm and rigid as in *F. elatior*. The O.P. is shorter (5-6 mm.) and although it may be very shortly awned, usually is blunter at the apex.

F. ovina (Sheep's Fescue) does not concern us, at this stage. It is a small grass whose flowering stems are only about 6-9 inches high. It forms a close mat of wiry herbage on dry limestone hills and chalk downs. We may, however, meet with one of its varieties in moister and richer soils; this is *F. ovina*, var. *duriuscula* (Hard Fescue). It flowers early in June and may be 1 or 2 feet high. The basal leaves are permanently folded but a few on the stem below the flowering panicle may be flat. Its O.P. is round-backed, 4-5 mm. long and ends in an awn about half as long as itself. *F. rubra* L. (Red Fescue) is a very similar grass found in sandy places or among loose stones. The importance of noticing the habitat conditions of all grasses cannot be too strongly emphasised.

We now turn to grasses, the outer pales of which terminate in awns which are usually long and easily distinguished. One of the commonest tall grasses—often lining country lanes for miles about the end of June—is *Arrhenatherum avenaceum* (False Oat-grass). The joints of its stem are frequently conspicuous from their covering of downy-white hairs. The stem is from 2-4 feet high and the panicle 6-10 inches long, closed at first but spreading when the flowers are ripe. The spikelets are from 8-10 mm. long and each contains only 2 flowers, the upper one perfect, the lower one having stamens only. The glumes are very unequal in size. The O.P. of the lower flower has a long twisted and "kneed" dorsal awn. The O.P. of the upper flower may be similar but more often its awn is only short and nearly terminal.

Very similar in general appearance are the species of *Avena*, but they are less common and their spikelets contain 2-5 flowers—if 2 only, *both* are perfect. *Avena pratensis* and *Avena pubescens* are frequent or common in pastures on calcareous soil. *Avena flavescens* (*Trisetum flavescens*) the Yellow Oat-grass, is often found in similar situations, especially where the grass is mown, and occasionally by the roadside. Its panicle is of a golden-yellow colour and very delicate in appearance.

We now come to the consideration of two common and important grasses—*Deschampsia flexuosa* and *D. caespitosa* (or *Aira flexuosa* and *A. caespitosa*). Both species are characteristic of special and distinctive habitats—the former *dry*, the latter *wet*, using these terms in a broad and general sense. *Deschampsia flexuosa* (Silver Hair-grass) is partial to dry heaths, heathy ground and the drier oakwoods or grasslands on non-calcareous soils. *Deschampsia caespitosa* (Tufted Hair-grass) is found in wet undrained grassland, damp oak-woods, marshy places on heaths, ditches, and boggy soils generally. It grows in dense tufts, 1½-4 feet high and is a most graceful grass. The upper surfaces of its leaves possess very high, rough and acute ridges and the basal ligule is long and pointed. The 2-3 flowered spikelets are silvery-grey or purplish in colour. The O.P. is thin, whitish, jagged at the apex and has a fine, hair-like, nearly straight basal awn about its own length, rarely protruding, and therefore often overlooked. *Deschampsia flexuosa* is a similar but much smaller grass, 12-18 inches high and its narrow leaves have their edges tightly inrolled, making them appear solid. The O.P. bears a twisted and "kneed" basal awn distinctly longer than itself.

So different are the habitats of these 2 species of Hair-grass that, after reading the above, it may be concluded that they are never found growing in close proximity. However, in actual field-work you may frequently have on one side of your path a heather-covered tableland or bank, and on the other damp ground sloping to a brook or drain. On the higher and drier side the presence of *Calluna* (Heather) leads you to expect *D. flexuosa* also, while on the lower and damper side the presence of species of *Juncus* warns you that the tufts of a similar grass there will probably be those of *D. caespitosa*.

The last of the grasses to be mentioned in this preliminary paper is the well-known Cock's-foot (*Dactylis glomerata*). This grows on almost every type of soil and is met with everywhere. Its stem is stiff, erect, 2-3 feet (or more) in height and very rough to the touch. At its top are usually 3 or 4 short stiff branches with large ovate clusters of spikelets at their ends. It thus presents a somewhat dense, heavy and less pleasing appearance than other grasses. The spikelets contain 3-5 flowers, the glumes are nearly equal and the O.P. ends in a slightly curved point often about one-third the length of the pale itself.

It is hoped that this short paper will remove some of the difficulties members have met with in using their Floras, and may have stimulated interest in these beautiful plants. A subsequent paper will deal with the grasses of particular associations. Meanwhile, to any students desirous of more serious study of grasses I would strongly recommend Armstrong's British Grasses, Cambridge University Press, as by far the most useful book for the purpose.

EVIDENCE OF A PREHISTORIC FLORA IN THE IVEL DISTRICT.

J. E. Little.

The reference numbers are those of the Bibliography published in the *Report of the Botanical Society and Exchange Club*, 1932, pages 384-387.

In 1891, W. Hill, my friend and companion of many rambles, described, under the title of "Our Forgotten Lake" (15, p. 91), a fresh-water deposit lying above Boulder Clay and at the base of Brick-earth then being worked for brick-making on the southern outskirts of the town of Hitchin, in the district known as "Sunnyside" or "The Folly," sloping towards the present drainage basin of the Ippolyts Brook, of which the nearest point is about 225 feet O.D. This fresh-water deposit lies slightly higher than the present stream level. The nearest bench-mark on the Sunnyside road is 243 feet, and the fresh-water deposit lay at this point about 10 feet down in the nearest pit, whence in 1907, under W. Hill's direction, I obtained nucules of *Chara* and carapaces of Ostracods. The brick-making has now (1932) been discontinued for a good many years, and all the exposures have been filled in.

The associated strata were in 1897 examined by Clement Reid (56), who gave determinations of Phanerogams and Cryptogams found in the fresh-water deposit. These determinations are here reproduced in full as they carry back our knowledge of the existing local Flora to a period preceding the "Palaeolithic brick-earth" (Reid) which overlies the fresh-water deposit, whether it be the result of a lake (Hill) or of a slow-flowing river (Reid).

"Hitchin yields strong corroborative evidence in favour of the conclusions arrived at in the Hoxne (Suffolk) Report, and adds somewhat to our knowledge of the temperate flora of the ancient alluvial strata lying between the chalky boulder clay and the Palaeolithic brick earth" (Reid).

"Such trees as the oak, ash, sloe, cornel, elder and alder point unmistakably to a temperate climate, and the fauna and flora as a whole suggest climatic conditions not differing greatly from those which we now enjoy. Mr Mitten writes of the mosses that 'all these are inhabitants of a sylvan temperate region . . . and none point to a different environment from that now existing; they are not arctic ' " (Reid).

It may be added that the part of the lake-bed first discovered by Hill lies very near the central line of a deep buried valley in the chalk of a northward-flowing river, proved by Hill in 1908 to extend from Langley to Holwell (57), and in 1912 extended to Henlow, Beds (58).

FLOWERING PLANTS.

(Det. C. Reid, 56, p. 45.)

Ranunculus aquatilis L. (aggr.).
R. sceleratus L.
R. repens L.
Montia fontana L.
Prunus spinosa L.
Poterium officinale Hook. fil.
Pyrus Torminalis ? Ehrh. (identical with seed found at Hoxne).
Hippuris vulgaris L.
Myriophyllum sp.
Cornus sanguinea L.
Sambucus nigra L.
Eupatorium cannabinum L.
Fraxinus excelsior L.
Menyanthes trifoliata L.
Lycopus europaeus L.
Ajuga reptans L.
Alnus glutinosa L.
Quercus Robur L.
Ceratophyllum demersum L.
Sparganium sp. ?
Potamogeton crispus L.
P. sp. ?
P. sp. ?
Naias marina L.
Scirpus lacustris L.
S. sp. ?
Carex sp. ?

MOSSES.

(Det. W. Mitten.)

Antitrichia curtipendula Brid.
Homalothecium sericeum Bry. Europ.
Hyocomium brevirostre ? Bry. Europ.
Isothecium ?
Neckera complanata Bry. Europ.
Stereodon cupressiformis Brid.
Zygodon ?

CHARACEAE.

Several species indet.

Of the Phanerogams one, *Naias marina*, does not now occur; and one, *Poterium officinale*, has not recently been recorded. There is a sheet in Henry Brown's herbarium, 1, vii, 1842, named *Sanguisorba officinalis*, but without locality. He was, however, on this date in the High Down-Pegsdon region, and the specimen may have been gathered in Herts or in Beds.

Poterium officinale was recorded by both Abbot and Saunders for several Bedfordshire localities, but the writer has never seen it in the Ivel basin of either county; and it may, like *Pimpinella major* Huds. in Herts, be one of the plants which is dying out, owing to drier conditions.

Montia fontana is not known to me as occurring during the last 40 years in the Ivel district, but was found at Hertford Heath, 1910, and Mardley Heath, 1914, in the Lea basin; and at Colney Heath, 1913, in the Colne district.

The other Phanerogams on Clement Reid's list still occur in the Ivel district. *Pyrus torminalis* is, however, represented only by a single tree.

Hill (15, p. 95), speaking of the nucules and casts of the stems of *Chara* discovered by him, remarked that plants of this group were "not now living in this immediate neighbourhood." They are indeed not abundant. But *C. vulgaris* was recorded from Offley in 1883 (12, p. 516). It occurred at St Faith's Well, Hexton, 1918 (det. J. Groves); the Stratiotes pond, Ickleford, 1922; Lax's pond, St Ippolyts (det. T. B. Blow).

A *Chara* was growing in a recently-made watering-place for cattle, below the spring on the Riddy Lane, Hitchin, 1932, but was cleaned away before it could be determined. It was probably introduced by some water-bird.

THE HEDGE WOUNDWORT—STACHYS SYLVATICA L.

G. F. Scott Elliot, M.A., B.Sc.

This is one of those very common "hedgers" which appear at first sight to be uninteresting and commonplace. It has a strong and rather unpleasant smell.

Flowers begin to appear in June and continue until October or even the second week of November.

It often grows profusely in wood-clearings or on the outskirts of all sorts of deciduous woods, even alder and willow brakes, but its favourite place is along a ditch below a hedge bank where sunlight falls upon it. It is not a true marsh plant like its first cousin, *S. palustris.* Nor is it really an alpine plant, though it has been found at 1500 feet in Northumberland (Tansley: Types of British Vegetation), at 1400 feet on the Whitehope, Dumfriesshire, at 1250 feet in Perthshire, and at 1600 feet on Snowdon.

It prefers a good loose and fairly rich soil, loam, leaf mould or even a rich roadside soil, though on main highways, which are carefully groomed, it is often replaced by *S. Betonica*, another cousin.

The flowers appear from June and last into October, which covers the busy season of the Bumblebee. At first sight there is nothing arresting about the rather dingy-red flower. But even a casual glance with a lens reveals a scheme of colouring which is delicate and charming.

It is really a harmony in reds; the upper lip of the corolla is dark and rich; the sepals are greenish-red with pink tips, whilst the lower lip is a fine purplish-red set off by ornamental pure white lines and spots. This three-lobed lower lip is the landing place for insect visitors and has a distinct velvety sheen produced, as in the Sloe, by the play of light amongst the little hillocks of the epidermis cells. At the tube-entrance there are stout white cushions with stiff hairs.

A strong stem may produce from 60 to 70 flowers. From quite early in the morning till dark, one has seldom to wait more than a minute and a half before seeing Bumblebees very busy amongst them. *Bombus* is recorded as the regular pollinator from Bremen, Brunswick, Schleswig, Flanders and Dumfriesshire.[1]

The Hive bee and a few of the smaller wasps and larger "hoverflies" also visit the blossoms, but it is essentially a Bumblebee flower.[2]

The insect works from below upwards, just as she does when engaged on Foxgloves; she alights on the lower lip, then holding on to the cushion-ridges at the throat of the corolla, her proboscis is guided in between these ridges and down to the honey which is secreted by the fleshy nectary below the four nutlets.

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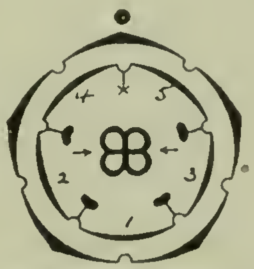
[1] Probably all species of Bombus visit the blossoms. In Dumfriesshire *B. pratorum*, *B. lucorum* and *B. Muscorum* are frequent.

[2] *Anthidium*, *Anthophora*, *Andrena*, *Podalirius* and *Eristalis* are recorded by various observers.

Now Bumblebees are often large and heavy, and the corolla during their visits must be subjected to considerable strain. Sometimes, indeed, one finds that five per cent. of the flowers are split lengthwise or torn, apparently through rough behaviour on the part of some boisterous visitor. Yet the arrangements for bearing the Bombus are ingenious and usually sufficient for the purpose. The upper lip has a slight forward curve. This part of the corolla, that is the upper line, is stout and strong and is also kept rigid by the stamen-filaments which are united to it. The calyx is also tough and mechanically strengthened by very thick-walled cells of which there are two or three layers. The calyx teeth assist for they also are firm and resistant.



FLORAL DIAGRAM OF THE LABIATÆ.

x Indicates the position of the missing stamen.
The arrows point to the line of division between the carpels.
● Position of the axis of the stem.
The outer ring consists of the 5 sepals.
The inner ring shows the 5 petals: 1, lower lip; 2 and 3, lateral petals; 4 and 5, upper lip, united.
The 4 stamens are shown as reniform figures.

The really interesting part, is, however, the lower line of the corolla. There is a narrow entrance where are the tough thickened cushions; then the corolla curves forward so as to form a slight bulge near the base, which rests on the lower part of the calyx tube.

Through these arrangements, the weight or forward thrust of the bee is distributed all over the corolla tube which, though tough, is not rigid but elastic, and the strain is also in part taken by the calyx tube. Nor is this last rigid; both the calyx and the pedicel can be seen to give or yield a little under the weight of the bee.

When just open, the two longest stamens are pollen covered; after an interval, they move to the side, out of the way, and the other two then move and shed their pollen; finally the style grows a little, curving downwards, and its two stigmatic surfaces open out so as to lick off any pollen which may be on the bee's head. As the younger flowers are towards the top, the head is well dusted with pollen before the bee flies off to older flowers at the base of the next spike.

Within the corolla tube, just above the four nutlets, is a little circlet of white hairs; possibly these may help to conceal the honey or discourage small thieves.

No unprejudiced person who examines the flowers or watches the bees at work can doubt but that these arrangements for pollination are both adequate and efficient in practice.

But to make out how they were ever developed, just along these particular lines, is a difficult problem.

The flower-buds do, however, suggest how some of the modifications may have arisen. The bracts are opposite; each successive pair being at right angles to the one below. The middle flower of each little group of three is covered by the main bract and is packed into the groove of the stem. The two side flowers (in bud) occupy vacant spaces above the centre flowers of their two neighbours. The internodes in bud are very short so that all the developing flowerets are very closely pressed under the bracts and between them and the stem.

It is at once clear that the fifth stamen-rudiment, of which the position is shown by an x in the figure, has had no chance of developing and must have been suppressed; as it is not there, one naturally finds no trace of a vascular bundle leading where it ought to be.

The stalks of the other four stamens are pressed against and adhere to the corolla.

In bud, one finds the upper lip of the corolla (two united petals) blocking the entrance of the calyx: it is folded over the lowest petal (under lip) which is bent inwards and downwards within the corolla tube: the two side petals are bent over and lie between the lower and the upper lip. These two lateral petals have very little chance of developing at all and become mere side ornaments of the landing-stage.

During the development of the flower, the corolla tube elongates; the upper lip can arch more and more upwards, but its tip is caught for a time within the throat of the corolla tube: the lowest petal (lower lip) can also grow downwards within the tube. All this time the four anthers are arranged in two pairs and almost fill the corolla tube below the throat.

The catching of the end of the upper lip in a little hollow within the entrance, and the position of the anthers seemed to me to involve the formation of the slight bulge at the base of the corolla. But I came to the conclusion that a satisfying explanation of the shaping of the corolla required what I have never received, viz., a thorough training in the art, or science, of dress-designing.

The lower lip does not get free so as to turn outwards and downwards until at quite a late period. It is only then able to spread out sideways and face the light: before it can do so, the veins which supply it have to pass round a curve of very short radius, for the line of the platform is at an angle of 240° to the line of the tube. This abrupt bend in the line of food-supply possibly explains the thick white cushion-ridges.

As to the circlet of white hairs above the nutlets, there will be in this part of the corolla an abundant supply of water: in both the upper and lower lip, growth is going on, but with difficulty. Yet these hairs and those on the cushion at the entrance of the throat have space in which to develop.

Now excess of water and a sudden arrest of growth sometimes result in the production of hairs. For instance, when the leaves of *Tropaeolum canariense* are eaten by snails, this plant, which is normally glabrous, becomes hairy. Dr Hill removed the leaves and found that a dense felt of hairs was produced in a few days. (3) It would be incorrect to suppose that this is a general law governing the production of hairs. Still it is the fact that one does find them in this flower both at the entrance and near the bulge of the lower part of the corolla throat, just where, according to this suggestion, they ought to appear.

So also the part below the ovary is just the place where one might expect an accumulation of sugar and it is here that the nectary is formed. This is the most usual place for the nectary (*Digitalis*, *Cardamine*, etc.).

Parts of the lower lip are folded inwards during the growth of the flower and may be in shade: it seemed to me that these folds afterwards became the ornamental white lines which set off the rich red of the platform, but as to this point, I am not quite satisfied. All these details seem minute and trifling; yet the peculiar folds during the development of the flower do, on the whole, seem to have had an influence in fashioning a corolla which is undoubtedly suited to the habits of Bombus. The insect no doubt assisted in the process of development, for those flowers which it liked and found convenient would be most frequently visited.

Towards the end of the season, grasses and other tall herbaceous plants are developing rapidly; the flowering stems of the Woundwort also become much taller. Growth whilst the seed is ripening is natural enough, for abundant food material is available and the shade and shelter of the companion grasses favour the quick formation of internodes.

After the corolla drops off, one sees inside the calyx-tube the four nutlets which are at first white and shining, but soon turn black. As the stem begins to wither, it becomes dry, tough and elastic and a vigorous swing of the stem flings out the little nuts. These last are each half carpels: the way in which they are placed close together in a circle involves two rather sharp edges or corners.

The epidermis cells in fruit are very thick-walled, but along these corners, the cells are drawn or squeezed out and their walls are thinner: when the embryo within begins to grow and enlarge, it is along these edges that the wall splits. (4)

The distance to which the nutlets are thrown may be perhaps 10 to 20 feet, which means that it might travel a mile during 300 years. But this would depend on the wind blowing along the road or woodside, and not towards the hedges or into a field, for it is very unlikely that the fruit would be able to find a good place to grow in either of these places.

I therefore tried a little experiment. The seeds were moistened with water; then I brushed them lightly with a pheasant's tail feather: they stuck to the feather and could be carried a mile and placed in a jar for two hours without falling off.

So in nature a pheasant could, in wet weather, carry the seeds for a mile or more. The seeds of the Foxglove and of Gorse can also be carried about by birds in the same way.

Most of the order Labiatae secrete essential oils of some kind. Sweet Basil, Marjoram, Balm, Lavender, Mint, Peppermint, Sage, etc., etc., belong to this order.

These oils are derivatives of sugars and glucosides, and are decidedly poisonous.

A plant of peppermint, if placed under a bellglass, will be poisoned by its own exhaled vapour in eleven days. If the air within the glass is artificially saturated with oil of peppermint, *Mentha piperita* will die in 74 hours. Lavender in a similar experiment was killed in 140 hours. (5)

The strong scent of these Labiates is of the very greatest importance as a protection against grazing animals.

This is particularly well seen in the south of Spain. Near Ronda, although the flat valley or "Vega" is rich and green and most carefully cultivated, the surrounding mountains and hills are stony and barren. Thorny plants, others which are excessively gummy such as Cistus, but especially strong-scented Labiates (Lavenders, Hyssops, Rosemaries, etc.) are, however, able to flourish, and one finds numbers of them all over the dry rocky hillsides.

In the morning, all sorts of animals, lean horses, patient cows, cynical goats, agile sheep and families of pigs, are driven out to pasture on the hillsides. They avoid the Labiates but are most efficient in discovering anything that could, even with difficulty, be eaten.

The strong scent of *Stachys sylvatica* probably explains the fact that it is not usually touched by rabbits or roedeer. Nor have I noticed any signs of injury by sheep or other domestic animals.

Insects do not appear to dislike this ethereal oil, for greenfly are often found on it: sometimes, indeed, 40 per cent of the leaves are holed or otherwise injured.

A common parasite is a "leaf miner," that is, a caterpillar which forms a winding burrow between the upper and lower surface. The egg is apparently laid within the leaf, and the grub's meandering path, which is white, contrasting with the green of the leaf, grows wider with the increasing fatness of the caterpillar.

I have not found records of true parasitic fungi on *Stachys sylvatica*, though other species are attacked by Rusts and Mildew (*Erysiphe*, *Septoria*, etc.).

Though it is improbable that Hedge Woundwort should entirely escape the attentions of fungus enemies, still the strongly scented oil may really be of some help as a fungicide.

But how is it that the order Labiatae managed to develop these essential oils?

Quite a considerable trade is carried on in Essences, Perfumes and the like, and, as is usual when business people are interested in a botanical question, observations and experiments of a reliable character are available.

In the first place, manufacture of perfumes is only commercially possible in countries where there is strong sunshine and a rather dry climate, as, *e.g.*, on the French Riviera. Attar of Roses is an important article of export in Bulgaria, but rosegrowing is only profitable in exposed and sunny situations. Sunshine and exposure seem, therefore, to assist in the formation of these essences. This is clear from the careful experiments of Lubimenko with Sweet Basil (*Ocimum basilicum*). He found that the energy of production of the essential oil depends strictly upon the intensity of sunlight. (6)

The sugars formed during the working of the green leaf are changed into celluloses, glucosides and essential oils. Are these latter due to the breaking down of glucosides under the strong respiration due to excessive sunlight?

Now let us assume that these essences or ethereal oils of the Labiatae are wasted glucosides, that is, pathological products brought about by excessive sunshine; this may be considered to be an adverse or distressing condition. Yet how extraordinary are the results of this evil. For, as we have seen, the plants themselves disgust grazing animals whilst they attract useful pollen-carrying insects. It is even possible that the exhalation of these essential oils in some desert plants forms an invisible halo in the air surrounding them.* This surrounding vapour is supposed, by some authorities, to assist in preventing loss of water by transpiration.

Nor for mankind are these products of disease without many and diverse advantages. All sorts and conditions of men, whether savage or civilised, appreciate the sweet scents derived from flowers. Moreover drugs, tonics, stimulants and disinfectants are derived from them, such, *e.g.*, as Lavender, Rosemary, Balm, Hyssop, Peppermint, Marjoram, Dittany, Menthol and Thymol. But we are forgetting Sage (which it is almost a duty to use with goose) and mint, which is inseparable from lamb.

Both leaves and stems are covered by coarse hairs (1-2 mm. long) amongst which are seated other glandular hairs.

The leaves are broad, ovate to cordate and coarsely toothed with a fairly long stalk. When plants are growing as they often do, amongst the common Nettle, the foliage is seen to be of a similar type, but only a rather unobservant animal could confuse the two.

On the upper side, there is the usual system of sunken veins and veinlets to carry off rain water, which drips from the point and is also carried down the grooved stalk to the stem and thence to the ground.

There is a stage in development in which the buds are quite beautiful: petiole and stem are bright red, while the young leaves are covered by pure white, silky hairs.

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*It is this vapour which flames up when a match is struck near a plant of Dittany.

In the bud, the leaf edges overlap and small red points can be seen on each tooth. If one dissects out the very youngest buds one finds leaves 1 mm. long, without hairs and with hardly any petiole. But there is a slight swelling where the petiole will develop.

As each pair of leaves is at right angles with the next oldest, this swelling blocks the entrance to the bud between the two older petioles.

Stachys sylvatica grows in a more or less shady place, and its leaves have to struggle for their place in the sun. Both stems and petioles are extremely sensitive to light. In the evening, I arranged a young stem in water, hanging over so that it pointed downwards: the two youngest leaves had also their upper surfaces facing downwards. I placed the vase near a window and found next morning that the stem had twisted right round. The leaves had also so turned that the light was nearly at right angles to the upper surfaces.

This experiment shows that stem and leaves are extremely sensitive to light from one side. It does not explain (nor do any other experiments known to me), how it is that the current of high speed electrons from the sun expend their energy in bringing the sensitive leaves into their natural and normal position.

But it is only when the stem and leaf are placed in their natural position that the upward flow of sap, the exit of water vapour from below the leaf, the entrance of carbonic acid gas and the inward or downward flow of sugar and other material can proceed in a symmetrically balanced manner. But of course this does not explain how this correct position is brought about. The hydrostatic pressure within the living cells no doubt keeps the stem upright.

If one takes a stalk of Woundwort and divides it in four, lengthwise and along the four grooves, each quarter curves strongly outwards, showing that there must be a strong pull or state of tension along the four corners of the stem.

It is by the balance of these four tensions along the ribs that the stem is held steady and erect.

Now if light falls upon one side of the stem only, the living cells on the dark as compared with those on the illuminated side, are under different conditions, and in all probability their turgidity or hydrostatic pressures differ considerably. This may have something to do with the curvature towards the light. This turning towards the sun can hardly be due to the *mere pressure* of light: this last has been measured and only amounts to some 4 mg. per square metre of absorbing surface. Yet tendrils do react to far less pressure than this, for they have been observed to contract under a weight of only .0002 mg. It is more probable that the cells which are alive and sensitive work differently under the light stimulus. Therefore their state of tension (or the hydrostatic pressure within them) must be changed by the incidence of light. However, this subject on which hardly two authorities agree, is too abstruse for treatment here.

The structure of the stem shows that the development of supporting or mechanical cells is chiefly along the ribs where, of course, the strain is greatest.

At each corner there is a mass of white collenchyma: the epidermis cell-walls are slightly thickened; just within the four pillars or buttresses, there is also a continuous ring (or rather rounded square) of mechanical tissue to which the bundles are attached: there are four large ones at the corners and smaller ones half way between these. Similar strong cords of collenchyma run along the corners of the petiole and a large bundle protected by a " deck " above and a " hull " below occupies the centre.

At the base the more or less horizontal roots from the lowest nodes assist in holding up the stalk: these have a central mass of wood and are tough and well suited to resist a tug or pull if the stem is bent sideways.

Stachys sylvatica has managed to develop a most remarkable arrangement for spreading in all directions. It is not at all easy to dig up a single plant: one finds many side-branches which began either above or just under the soil; they grow outwards and downwards to a little distance before they become erect and form a flowering stem. Some of these subterranean runners may come to the surface and then creep or wind along it even to six feet away from the parent stem. These may, when they find a suitable place, become vertical and flower: or they may turn down into the soil and form a winter bud. Other underground runners only grow a short distance before doing so. The runners have absorbing roots and their leaves are reduced to mere scales: the terminal bud which lives through the winter underground is covered by scale leaves and is packed full of reserve material.

Another species, the Japanese *Stachys tuberifera*, which is cultivated as a food plant, forms small elongated tubers which resemble contracted and specially thickened runners: the flavour of the tubers *may, perhaps*, resemble that of artichoke, especially if one imagines them to do so.

These wandering stems and runners above and below the ground can, of course, be most easily produced in leaf mould or rather loose soil. M. Chaillot also explains that, in shade, branches which should have grown upwards and flowered, simply creep along the surface: without light, they cannot form the necessary upright stem and enough food material for flowering. (7)

A plant happened to be growing in my garden between rather a thick hedge and a garage. Thus there was a shortage of sunlight, as the hedge was only 4 feet away from the garage. A strong runner with many branches grew out to beyond the garage, until it got into the open a distance of some 12 feet, and then flowered.

Each winter-bud may next year develop a similar complicated arrangement of colonising shoots.

The flower of the Labiates is characteristic; moreover almost all the 134 to 150 genera of this order seem to have precisely the same design, except for the extraordinary, balanced seesaw stamens of Salvia and a few others, and for a few modifications in the nutlets. But a number of curious departures from the ordinary type of *Stachys sylvatica* have been recorded by Mr Cutting in a most interesting research. (8)

He found many cases of united flowers (similar to those which may be noticed in *Prunus spinosa*), and which, through insufficient light, frost, or other adversity, were unable to open and pollinated themselves in bud. Sometimes also the carpels became like ordinary leaves and the flowers were green: this last sport may have been induced by insect parasites.

The most interesting departure from the regular type were, however, symmetrical or nearly symmetrical flowers, and others with the variations shown below.

	Number.	Number of individuals.
Sepals	4	11
Petals	divided	many
Stamens	5	10
Carpels	3	5

There were also cases in which the anthers were included in the throat of the corolla (as in *Marrubium*) or in which there was one petal in the upper lip and four below (compare *Teucrium*).

Now the ancestor of *Stachys* was surely quite regular and symmetrical with all its parts in fives. Those with five stamens show that a primitive member, once lost, can be developed again; so also do the others with 3 carpels. The symmetrical ones are the most interesting of all. Of these Mr Cutting says "one flower, a middle one of a stalked side-inflorescence, was pseudoterminal owing to the destruction of the adjoining side inflorescence and of the main axis."

It developed in an almost symmetrical manner. All his nearly regular flowers were apical flowers on side inflorescences, "and their position on the plant was rendered more symmetrical either by injury to the main stem" or by the development of other flowers between it and the main axis.

These unusual cases seem to favour our suggestion that one of the impulses which ended in the Labiate design was the tight packing of the infant flower between the grooved stem and its covering bract.

With reference to the variant with four sepals, this is a new departure. Mr Cutting suggests that four sepals were formed in consequence of there not being sufficient food material to produce the usual five. The case of *Caltha palustris* seems to bear out this theory.

All these variants or original departures appear to show that even in highly specialised flowers, modifications may be produced to-day. Plants have *not* lost the power of variation: if any minute difference was of the least appreciable advantage, it might in a certain number of generations end in becoming a new species.

As we have seen above, one flowering stem may form 60 flowers and 240 nutlets. If one takes 5 flowering stems as being on an average the number produced by a plant, then 1200 plants might grow from a single nutlet. If the number of plants remains unaltered from year to year, the chances of survival are therefore less than one in a thousand, and the slightest real advantage would have a distinct effect.

Has the Woundwort any particular share in the work of the Oak forest association? It is not at first sight obviously useful. But, in prehistoric times, there were no hedges; the country where it grew was covered by Oak scrub or forest. Its favourite situation must have been then (as it is to-day) about the edges of a wood or in clear spots such as might be produced by a fallen tree. It requires shelter, light from one side, and prefers rather loose, fresh or moist soil such as good leaf mould.

Stachys sylvatica, moreover, seldom remains more than one or two years in the same situation, at least, under natural conditions. It is often suppressed by a thicket of thorny plants, especially raspberry, bramble and rose. This thorn entanglement, as I have tried to show elsewhere, is a definite stage in the natural reafforestation of the Oakwood.

What would happen if *Stachys sylvatica* had not been present when an open place was formed as by, *e.g.*, the fall of an ancient tree? The sunlight would reach the forest floor, the surface would be dried up; sour acid humus would develop, and whole populations of worms, bacteria, fungi and protozoa would perish. So one may suggest that *Stachys sylvatica*, with its possible twelve hundred offspring from every single fruit, acts as a sort of catchdrop. By quick and dense growth, it keeps the forest soil in good order and in due course makes way for the pioneer Raspberry and Bramble. Whether this suggestion is correct or not, *Stachys sylvatica* merely by the fact that it makes use of sunlight energy, which would otherwise be wasted or even harmful, has clearly a part to play in the work of its association.

Sometimes one finds *Stachys sylvatica* along the edge of a plantation, whilst a little way within the wood, it is replaced by the Wood Sage (*Teucrium Scorodonia*). Experiments (Rosé) have shown that this last-named plant prefers a dim light equivalent to three-fourths of full sunshine. (9)

There are more than 200 species of *Stachys*. It would require more space than can be allowed here to trace its distribution in an adequate manner. *Stachys* does not occur in either Australia or New Zealand, but has been found in most temperate countries, including South Africa and Chile.

S. sylvatica appears to occupy the whole of that area which had been devastated during the Ice Ages and afterwards occupied by the central European Oak Forest.

It has been found in the Mid Pliocene deposits of Tegelen s. Meuse, as well as at Cromer Upper Pliocene by Dr and Mrs Reid, and in the Hitchin warm interglacial interlude beds.

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THE BIRCH—BETULA ALBA L.

G. F. SCOTT ELLIOT, M.A., B.Sc.

The Silver Birch is perhaps the most charming, graceful and elegant of all our British trees. Yet it is a very ancient type, dating back to the end of the Chalk period, when archaic conifers and the clumsy Cycas still dominated the world.

During the Cretaceous and Tertiary period there were some 27 species of Birch growing in North America, and our Common Birch (that is *B. alba* L. in the general sense) has been recorded in Europe and America from the last of the Tertiary period (Pliocene) until the present day.

At Andebot, France, in the early (4) and at Cromer in the uppermost Pliocene, the true Birch was growing in abundance and was no doubt devoured by *Elephas meridionalis* and other animals of the period. Dr Reid records it for West Wittering (Sussex) during a warm interlude in the Ice Ages, whilst towards the close of the Glacial period its remains have been detected at Bovey Tracey, Devon, in the Isle of Man, and at Crianlarich in Perthshire.

Before describing the present world range of *Betula alba* (*sensu Linnaei*) it is interesting to trace the modern distribution of the genus *Betula*. If we assume that its original birthplace was in North America and that it spread westward over Asia and Europe, then we find that some ten species have been differentiated in North America. Korea and Manchuria have each two species. Japan has six, and China fifteen or more. One may suppose there was a forking of the highways of distribution at Behring Straits; along the northern route there is a special species in Kamschatka and six in Siberia; in Northern Europe, *i.e.*, in Scandinavia, there are six species. Along the route running south of the Gobi and the Central Asian deserts one finds two special species along the Himalayas. There is one in Central Asia, another in Asia Minor, one in Hungary, and again another in Belgium.

I admit that there is no convincing proof that North America was its original birthplace. The original ancestor of all the Birches was no doubt a hardy, adaptable, and very ill-defined species. *Betula alba* itself is still hardy, adaptable, and not very well defined.

Linnaeus, as well as both Bentham and Hooker, considered *Betula alba* to be one species. Modern botanists prefer to divide it into two distinct species with several varieties and forms. This difference in opinion arises merely from the way in which the word "species" is construed. The two forms which are common in Britain are *B. pubescens* Ehrh., the usual Birch of wet places, marshy ground or peat mosses, and *B. verrucosa* Ehrh., the dry ground form.

I have, for form's sake, placed in an appendix the best distinctions between these two species. But those differences between the two which are unmistakable are not reliable and those which are reliable are not at all easy to make out.

When the Ice Age had passed away, almost all Europe, as well as much of Asia and North America, were devastated areas covered by barren rock, sands composed of the most refractory minerals and wide stretches of boulder clay, interrupted by enormous expanses of lake and marsh. All this desolation had to be rendered fit for occupation by vegetation. Nature proceeded to do so after a careful systematic fashion which has been revealed by the laborious and systematic study of the peat mosses of Scotland, England, Holland, Norway, Sweden, Schleswig Holstein and North Germany.

In the Netherlands one finds, at the bottom of the peat, mosses and lichens such as now flourish in the desolate " tundras " of the Arctic Circle (13). Next there is a layer of Dwarf Birch with little polar willows. Above these, remains of *Betula alba* and Scots Pine are found. The next layer contains Oak with Hazel nuts, and, at a much later period, a Beech forest replaced the Oak and covered a large portion of Holland.

In Schleswig Holstein also, the oldest forests consisted of Birch and Aspen Poplar (14). These were followed by Pine and Spruce which gave way to Oak Woods. The Beech to-day is the usual natural forest. Quite a similar succession has also been recorded in Denmark as well as in Scotland, Norway, Sweden and North Germany (15). The evidence is a little confused and difficult to read because the Ice Age did not die gradually away with a slow, steady, and continuous improvement of the climate. There were relapses in which cold conditions prevailed and which were followed by genial periods. Nevertheless, it is impossible to doubt that the conquest of the land by vegetation proceeded in an orderly succession of the following five or six stages:—(a) First, algae, lichens and mosses; (b) then dwarf shrubs, chiefly belonging to Ericaceae (*Vaccinium*); (c) Birch, with very soon afterwards (d) Scots Pine or some other conifer; (e) there was an invasion of Oak forest which in many parts of Europe was eventually suppressed by Beech (f).[1]

But as in (*e.g.*) Northern Sweden, where the country has not been entirely changed by the action of grazing animals, and by the burning of heather, it is just exactly this succession which one discovers whether one proceeds north or ascends the hills (16). After passing through a forest of Pine or Spruce, one finds Birch beginning to appear. On still more exposed and colder summits, Birch grows by itself. At a still higher level, there is a country of dwarf shrubs such as Blaeberry, other Ericaceae and *Betula nana* (obviously stage b) and at the very summit or in extreme northern latitudes, one finds only lichens, mosses and a few scattered alpine-arctic pioneers.

A similar succession may be found on almost every mountain range, even quite far to the South. There is almost always a " summit flora " in which the most exposed rocks are covered only by lichens, mosses and alpines. Below this are Blaeberry, Heather, Dwarf Birch or other small shrubs. Great stretches of the mountain side are usually covered by Conifers. Below them again is the domain of the Oaks and other deciduous trees.

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[1] The succession was very clearly stated by the late Dr R. Smith; most unfortunately it was not taken as a classification for British oecology (12).

The vast pre-historic forest of Germany or rather of Central Europe, in which Oak was the dominant tree, was therefore nearly the final stage in the new reclamation of the land after the disappearance of arctic conditions. So also the great conifer forests of Norway, Sweden, Russia, and Siberia represent the fourth stage in this succession.

Betula alba (third stage) seems always to be the pioneer of the Conifer forest, although it holds its own in clearings both in Pine and Oak woods.

Besides the fact, not without importance, that the vegetation of the Northern world is still at work in reclaiming Europe and Asia, the reader will observe that it is always the better, the more complex and more interesting form of vegetation that overcomes.

However, one at once asks why is it that the Birch is found farther north and at higher elevations than any other tree? Both its pioneers and itself have a very uncomfortable existence. In Lapland the Birch may require fifty to sixty years to form stems only six feet in length and four centimetres in thickness (17). These are often prostrate, either hugging the ground because of the greater warmth near the soil or simply because almost constant blizzards keep them from growing up. Even in Lapland, however, one does find trees, three to six feet high, but only in genial, sheltered places. Once established, more and more trees grow up and provide mutual protection.

Within the Arctic Circle and on Kabnekaise, 67° N. lat. (which is some 2123 metres in altitude), there is a rich growth of *Betula* and its usual associates. In Asia and even in North America one also finds a *Betula* of some kind thriving nearer the north pole than any other tree. In America there are special species in the far north of Alaska (*B. alaskana* and *B. Kenaica*) but the Paper Birch (*B. papyrifera*), which was supposed by Hooker and other botanists to be a mere variety of *B. alba*, grows on the shores of the Great Slave Lake, of Hudson's Bay, and in Labrador.

So, also, even as far south as Spain and Corsica, Birch is the hardiest of mountain climbers. There are forests of it in the Caucasus and in Afghanistan. On the Himalayas, Younghusband, during his descent from the snow line, passed first through birch woods and then through the forest of Conifers (1, Younghusband).

There are reasons for this extraordinary adaptability of *Betula*. Except that it is not so common on limestone, the character of the soil does not seem to influence its development, for it flourishes on the warm, sun-scorched sandstone of Saxon Switzerland, on the granites and gneisses of archaic mountain ranges, but also in swampy woods of willow and alder, on boulder clay and even on the surfaces of peat-mosses which are beginning to dry up.

One of the chief difficulties in the early stages of colonisation is that the peat-moss Sphagnum is apt to invade the dwarf-shrub stage.

If Sphagnum is favoured, as by want of drainage, a peat-moss will develop; the growth of the Sphagnum so long as it is saturated with water is so vigorous that roots of other plants cannot obtain oxygen, and are suffocated and the result is a peat moss.

Such a moss goes on growing upwards vertically and also increases at its edges until there comes a time when the upper surface is so exposed to wind and sun that it can no longer remain full of moisture.[2] It is then invaded by Cottongrass and by two heathers (*E. cinerea* and *E. Tetralix*).

The process is very well illustrated by the story of Lochar Moss in Dumfriesshire. It was originally the estuary of the river Nith and, of course, suffered the transgressions of the sea, followed by elevations of the land which characterised most of the Pliocene and Glacial periods. Towards the end of the latter era, the river Nith was finally blocked out of its estuary by the last elevation when the 25-30 feet beach was formed. No doubt the enormous deposits of gravel, sand and mud carried by the river choked its own channel so that it was diverted westward and had to cut a new path seawards by Dumfries and Glencaple (17).

So far as Dr Lewis' researches have shown, the present valley became a vast marsh of *Phragmites*, resembling that which exists to-day in the Danube region. Then there was an invasion of Sphagnum. For some time Cottongrass and Birches managed to hold their own on the surface but they were eventually conquered and the whole valley became unhealthy, marshy and mossy. Remains of dug-out canoes, precisely similar in design to those of central Africa, have also been found in it. The Lochar and other small streams did their best to clear the channel, but their want of fall produced no real satisfactory drainage.[3] Considerable portions of it were in 1810 to 1830 reclaimed by a few energetic and enterprising proprietors, but even to-day the fight between Sphagnum, Cottongrass and Birch is still going on. The Cottongrass (*Eriophorum*) and Heaths (*Erica cinerea* and *E. Tetralix*) can be found establishing themselves in places where the surface is not quite saturated. After these plants have managed to form a thin layer of more or less dry, peaty material, the common heather (*Calluna*) manages to develop. Hardy little Birch seedlings may be found at this stage growing vigorously, and even amongst the bell-heather. In a few places where there are old Scots pines somewhere at hand, one even finds stunted shrubs (often attacked by caterpillars) or seedlings of this pioneer tree. So one can actually see in action to-day that natural reclamation of the land by Birch and Scots Pine which has proceeded all over Northern Europe during the retreat of the Northern ice.

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[2] The extraordinary shrinkage of peat mosses when drained has been clearly shown by Major Gordon Fowler, *Geographical Journal*, February 1933.

[3] It remained a most dangerous place throughout mediaeval times. A knight and his horse or rather the remains of them are said to have been discovered in it. Until 1914 a curfew bell was rung in Dumfries every evening, to warn travellers who might have lost their way.

The Birch is therefore a most important agent in the improvement of the world. Having established itself on peaty moorlands and even on old mosses, it will be eventually suppressed by the Scots Pine for it is neither so long lived nor can it endure the denser shade.

A peculiarity of the Birch is that it is an excessively thirsty tree; it is "constitutionally dry." According to Von Höhnel, a birch tree, with say 200,000 leaves, will, in hot weather, transpire from 300 to 400 kilograms of water per day, that is, from 6 to 8 cwts., or from 66 to 88 gallons. An acre of birches (6 feet apart), that is, 1210 trees, would extract and evaporate from 363,000 to 484,000 kilograms of water, that is, up to 106,480 gallons, per day.

As a drier-up of the soil, Birch is easily first, as the following figures show:—

Average transpiration from June 1st to November 30th.	
Birch,	67.987[1]
Lime,	61.519
Ash,	56.689
Beech,	56.251
Oak,	28.345
Scots Pine,	5.847

Another method of estimating the force with which water is absorbed and transpired consists in placing a young branch in a glass tube full of water which dips into a bowl of mercury. The suction due to the transpiration of the leaves draws the mercury up into the tube. By experiments of this kind, shoots of *Betula alba* were found to exert a suction or pull equivalent to the pressure of three atmospheres. The extremely thirsty nature of the Birch is clearly an advantage when it is either colonising or holding on in wet mossy land. It has also an advantage in its arrangements for protecting the young flowers.

Catkins are formed early in the summer of the previous year. (In Austria in 1890 the infant male catkin was produced on the 8th May, that of the female on the 4th June.) As the pollen is not scattered until the following April (that is, just before the leaves unfold), the young catkins are exposed throughout the winter to rain, frost and insects. The outside covering of the catkin is composed of the bud scales, which are gummed together; rain runs off the surface without wetting it, and so no film of moisture is left in which dangerous fungus spores might germinate.

The best time to examine the male flowers is in April or May, when they are just opening. If a small branch is placed in water, they will develop quite well indoors and all the stages can be easily seen.

[1] The figures represent number of grammes of water lost per 100 grammes of dry weight of leaves or needles (10).

The central part of the scale is brown; there are two side lobes which are united to it. Within are three much reduced flowerets consisting of apparently four stamens and two sepals.[5] The scales overlap in a very peculiar way so that in the winter the outside surface is continuous, brown and gummy; the little hollow between the bracts is completely filled by the flowers which are enclosed in the white, papery sepals.

The catkins droop, hanging nearly vertically, so that the oldest flowers are above the younger. When the catkin is going to open, the main stalk elongates and separates the individual scales; thus a little open chamber is formed, of which the floor is the back of the younger bract below, with its two attached bracteoles. Bright yellow pollen falls into this little receptacle and is there heaped up.

I arranged a jar with opening catkins at a height of seven inches above the surface of the table. Tapping the catkins resulted in clouds of pollen. Some of the pollen-grains rose upwards and were carried off by faint currents of air; those which fell on the table took from 3 to 8 seconds to drop seven inches. Thus if a birch tree is only 50 feet or say 49 feet high, the pollen-grain would require from four to eleven minutes to reach the ground, and the slightest wind would carry it a very long distance away. Enormous quantities of pollen are produced. Indeed, in the Oldenburg so much birch pollen falls in certain lakes that it is found possible to use the humus-slime technically.

On comparing the scale of a very young male catkin (next year's) with one which is mature, one seems to get a hint as to how the peculiar structure is brought about. Those parts of the scale which are exposed to the air become hard and brown and are soon gummed together, forming the outside casing. Within this, growth continues in the lower parts of each scale, and results in the remarkable shape of the mature bract.

The drooping male catkins, their yellow pollen, the upright females, which have bright red styles, and the young unfolding leaves, are exceedingly beautiful.

To examine the female catkins, it is perhaps best to wait until the fruits are ready, which is not until August. They are then from 1.5 to 2.2 cm. long and nearly 1 cm. wide.

Here again the protection of the young developing fruits is of an exceedingly thorough character. The outside of the bract is sticky or viscous; each has also a border of minute hairs: the stalk is stout and is seen (under the microscope) to be mechanically very strong. Each bract is firmly pinned down by its neighbours. Indeed to open out one bract, some five to seven others have to be forced upwards. Yet in spite of all these precautions, insects very often do injure them. The enemy burrows along the main stalk and groups (or even a whole row) of flowers, are robbed of nourishment and become dead, brown and withered, before they have the chance to open.

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[5] Some authorities believe that there are only two stamens each divided or branched; the sepals are sometimes supposed to be the two bracteoles of the lateral flowers.

The tiny nutlets lie within the concave inside of the bract, the two side ones occupying vacant spaces below the lateral lobes. This explains their shape for the thin white wings can only develop sideways. These wings are prolongations of the mid-rib part of the carpels.[6] They can just find space to grow in the positions in which they lie.

The smooth nutlet with its streamline contours and thin wings is a miniature glider of a most efficient design.

It is recorded that, during snow storms, birch-nutlets were carried right over the tops of snow-covered or bare hills, and to measured distances of from 500 to 1000 yards.

The quantity produced is enormous: an ordinary catkin has some 80 bracts, that is, 240 nutlets.

In an old oak coppice where there happened to be a few birch trees, every handful of soil contained hundreds of nutlets. They occurred even within the bark of rotting branches, which makes me suspect that worms or insects carry them about, but I could never catch one doing so.

According to Dr Guppy, the nutlets float for a few days and he often found them in the drift of the Rivers Lea and Thames. A water bird might quite easily carry away mud with nutlets sticking to it.

I wanted to get a rough idea of the chances of any single nutlet replacing its parent in a particular place. So I cut down a young healthy tree, which turned out to be 55 years old, and counted the number of male catkins. There were 4692 of them. I estimated that there were at least 3128 female catkins.

Then as there are some 80 scales on a female catkin, and each scale has 3 nutlets, this made 240 nutlets per catkin. As 3128 × 240 makes 750,720, three-quarters of a million nutlets were being launched upon the world by that one tree in a year!

After the nutlet has finished its travels by air, water, or on a bird's foot, it will not, even if exposed in a cold frosty situation, be injured, for its reserve material consists of fat or oily matter, not of starch.

In germination it splits open along the attachment of the wings; M. Joxe explains that this is the thinnest part of the shell: this must also be the very last part of the carpel to harden off. The minute embryo root then grows downwards into the soil.[7] The two cotyledons soon get out of the seed-coat; they are small (3-4 mm. × 2.5-3 mm.) oblong-ovate, and have a short stalk 1.5 mm. They are carried up to about 8 mm. above the soil. The first ordinary leaf is not much like those of the typical birch, being small ovate, three-lobed or trifid and three or obscurely five-nerved. The second and third are more of the ordinary birch type.

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[6] According to M. Joxe they are almost entirely formed by the epidermis (2).

[7] According to Mr Paulson there are minute points or hooks all over its surface which carry down into the earth any fungus-mycelium which it happens to encounter. Fungus hyphae (Sporotrichum sp.) are often to be seen on the styles of the nutlet. These and other fungi in the soil are thus, in his view, brought into close contact with the root from the very beginning (4).

Sometimes, as in Lord Avebury's figure, the fourth and fifth leaves are cordate, closely serrate and velvety hairy. These last resemble the leaves of suckers growing from the stump of a felled tree (5).

Birch roots possess business friends in the shape of mycorrhiza fungi. These are particularly useful to pioneer birches. According to the excellent account given by Paulson, the work of absorption is left to the mycorrhiza. As a rule no root hairs are developed and seedling birch-roots are swathed in the mycelium from a very early stage. These fungus threads penetrate into the root, whose outer cells become enlarged: the root itself is thickened and becomes white or yellowish-brown. Both the root and the mycelium of the mycorrhiza grow through the layer of leaf mould below the mosses which in a birchwood generally cover the ground. The following fungi have been recorded as birch mycorrhiza in Britain. *Agaricus muscarius* (Fly mushroom), *Boletus scaber*, *B. radicans*, *Amanita vaginata* and the Puffball (*Scleroderma vulgare*) (9). *Cortinarius* sp. and *Boletus scaber* have also been noticed on the Paper Birch in North America (9b).

The foliage buds, which are most easily seen in the month of May, are very carefully protected. The very young leaf has no leaf-stalk: its two halves are folded together and are enclosed in the stipules which are green, spoon-shaped, and sticky, as well as hairy along the edges: these stipules soon fall off. The outermost five or six budscales seem to have been arrested in growth and killed off; they are hard and chestnut brown in colour. The lowest scale is like that of the Sloe, a mere rim with a point.

If one tries to lever up a single scale with a pin, the overlap and arrangement of the scales is such that it is most difficult to do so: the tough stipules, hairs and general stickiness would seem to make it almost impossible for insects to do any harm. And yet, very soon after the buds had opened (May 24th, 1923), I once found that 79 per cent. of them had been more or less injured by insects.

The structure of the leaf is simple yet effective. At the midrib there is a strong development of supporting or strengthening material: crescents of this hard tissue enclose the main bundle: the upper one of these is joined on to the epidermis; there is another independent supporting crescent on the under surface just below. The petiole is remarkably tough and flexible: in microscopic section, there is an infolding along the upper line of the bundle.

The object of some of these minute details is quite clear if one watches a birch tree in a severe gale of wind. Everything yields and sways: branches, branchlets and petioles are flexible and, so far as may be, tend to get in line with the direction of the wind. The petiole inclines to twist and untwist, and the flat part of the leaf flutters, curving upwards and then downwards. The vascular bundle, owing to its peculiar shape, will not be injured during the twists, nor will the blade of the leaf be damaged, for the arrangement of the strengthening material is such that it always tends to come back to the correct normal shape (6). The curve of the base of the leaf and the series of teeth along the edge will also throw off the wind just as a ship's bow throws off the water. At the ground the trunk ends like the base of a pillar in an outward curve; the roots also act as buttresses. In a violent gale, when the trunk is swaying to and fro, the advantages of this arrangement are obvious.

Now all ordinary trees increase in diameter every year by the growth of a circle of living cells, the cambium, which lies between the wood and the bark. By the division of the cambium cells new wood (that is, water conducting tissue) is formed inside, and on the outside new bark (*i.e.*, sieve tubes for conducting more or less elaborated material).

At the beginning of growth in spring, the whole outer surface of the tree is covered with a continuous sheet of cork. The growth or expansion of the cambium has to overcome the restraint of this tough elastic covering.

The pressure due to the weight of the tree acts vertically downwards: this is counter-balanced by the resistance of the main roots. So there must be a resultant force tending outwards, that will assist the expansion of the cambium, which is probably also stimulated by the strain. Those of its cells which are forming the annual ring in this part of the stem are favoured: they show as M. Jaccard puts it, "transgressive growth;" the width of the annual ring is distinctly greater in this part of the stem (8). This, of course, results in the graceful outward curve at the base of the tree with which our eyes are perhaps unconsciously satisfied just because of its architectural effectiveness.

Here again a danger has of itself produced an adequate reaction. The roots spread more or less horizontally. In dry ground, birches are seldom uprooted, but a solitary birch in very wet or marshy places is often torn up, carrying with it an enormous mass of mud.

One of the special beauties of the birch is the shimmering white stem: the younger branches are yellow or red, whilst the twigs are almost red or dark purple. There are differences in the colour of a birch wood as seen in mass throughout the winter, but at one particular time, a rich and vivid red colour suddenly appears, which is perhaps specially attractive because it shows that "gloomy winter is now awa'."

It is worth while trying to explain these changes, for, besides being beautiful, they are of real importance in the life of the tree. The white colour is due to the effect of light on the numerous very thin sheets of the cork cells which contain birch-camphor (betulin).

But underneath the thin, paper-like layers of cork-cells one finds (in a microscopic section), the outermost still living cells which are full of a rich orange-tawny material. It is clear then that in the vigorous rush of the spring-sap for the use of developing buds, the outer layers of cork break and peel off, so displaying this splendid red. Beneath these cells one finds in young branches bright green cells which, of course, assimilate and produce sugar. They are strengthened by being thickened at the corners so forming a peculiarly tough outside layer.

It is not possible here to go fully into its anatomy, but the wood is remarkable for its close even character, and for the numerous medullary rays full of protoplasm.

In a twig only one year old, the outside is generally plastered over with an extraordinary collection of dust, algae, bacteria, lichen-soredia and the like, through which the hairs protrude. Amongst these the green four-celled packets of the alga, *Pleurococcus*, are most conspicuous.

Now if one puts oneself in the position of a hungry insect or of the delicate germ tube of a parasitic fungus trying to penetrate the stem, one realises how difficult its task must be.

On the one-year-old twigs, the mixed population of lichens, algae and dust is a hard proposition for an invader. The next younger twigs are smooth so that they dry quickly and the cork is full of antiseptic betulin. Birch bark in fact contains 12 to 14 per cent. of this substance. Moreover the regular peeling off of the bark, which is a real spring-cleaning, removes both insect eggs and fungus spores.

But, if an entrance can be managed, there is a rich store of food in the living cells, for the sap itself contains 2 per cent. of sugar, and there are rich reserves in the medullary rays and pith. Even the dead cells within the layers of cork are able to yield a livelihood to many different fungi.

These remarkable points in the anatomy of the stem are of great interest to mankind, for the birch is one of the most useful of trees (7).

Thus "Birchwine" or "Birch champagne" can be made from the sap. Birch bark is used for canoes, roofing and wigwams. In Russia the inner bark is ground up, mixed with caviar and eaten. Extract of the bark is also used for tanning, as, *e.g.*, in the manufacture of Russian leather: the oil distilled from it waterproofs leather. Professor Henry states that the oil of birchwood mixed with alcohol and smeared on the face and hands is the very best protection against midges and mosquitoes. Birch tar still appears in books on Materia Medica (Dagget, Oleum Rusci) and is described as a *stimulant*, *irritant* and *insecticide*. In medical practice during the middle ages, its properties were held to be of the most remarkable character. It was used for diseases of the digestive system, of the kidneys, for lithiasis, scurvy, itch, worms, hypochondria and melancholy. Persons suffering from consumption were bathed in its sap, and those troubled by unrequited love were advised to drink it as a love potion. Possibly physicians endeavoured to make it plain that there were things far worse than celibacy.

The Birch is grossly neglected in Great Britain, and indeed is often considered by foresters as a mere weed to be ruthlessly eradicated. There is some foundation for this prejudice for the growth is so rapid and vigorous that young larches or other conifers may be suffocated: a young tree not more than 17 years old was 24 feet 6 inches in height; whereas one foot per annum is considered quite a good average growth for Conifers. Mixed planting of birch and conifers is objectionable, for the tough flexible twigs are apt to do harm by whipping the foliage of Scots Pine and Spruce. A Birch stake or stob used in fencing becomes rotten in five or six years. The wood when attacked by fungi and insects crumbles to powder though the bark is almost indestructible, and is hardly injured at all.

But few people seem to realise the usefulness of Birch. The twigs and finer branches are of value especially, and first of all, in education. Even in Roman times, children were doubtless in after life most grateful to its tough, fine wiry and flexible twigs. These twigs up to half or even three-quarters of an inch in diameter can be made into brooms, besoms, baskets, mats, peasticks and ships' fenders.

Until recently, in those steel works where ships' plates were manufactured, one could see a huge mass of red-hot glowing metal carried on chains and laid on the ground. Quantities of birch twigs were quickly scattered over it and disappeared in a moment. This process destroyed the "scale" of the iron.

Branches from a half to one and a half inches in diameter can be used for crate-wood and garden stakes. Larger branches and stems from one and a half to six inches supply stakes and stobs, especially when creosoted.

From four inches diameter to any size, the wood is made into clogs, pattens, and bobbins of all kinds. It is also the very best of fire-wood and has a slight pleasant fragrance when burning. The wood is easily worked and takes a beautiful polish. Spoons, plates, toys, bowls, cigar boxes, handles for tools, carding teeth, etc., etc., are all manufactured from it. All these varied and manifold uses of birch depend on the even close character of the wood. Sometimes one finds burrs of large size upon the branches: these are curiously marked and in Germany, beer-jugs are carved from them.

The food material stored up in the stem consists either of starch, or in winter of fats or oils. Fats prevent too severe cooling of the tissues and are themselves the result of very low temperatures.

The enemies of the Birch are of the most varied character. Roe-deer, rabbits and indeed all grazing animals greedily devour the young shoots and especially the seedlings. If, however, even a small piece of a seedling escapes destruction, it puts out a fresh branch next year, and goes on doing so every season afterwards. The result is a short, scraggy, stunted and much branched shrub. If the ground is favourable and is not set on fire, and if there are not too many cattle, sheep and rabbits, a dense thicket develops into which nothing but a half starved beast would care to struggle. Then when the natural vigorous rapid growth of *Betula alba* has a chance of showing itself, a birch forest will develop, for the stems will soon be above the reach of all enemies. In prehistoric times, until man began to want firewood and invented the destructive habit of burning off natural woods to grow bere (or barley), the number of deer would be limited by wolves, so that it is probable that forests of Birch and Scots Pine covered the whole countryside.

Blackcocks and greyhens are fond of the catkins and devour the buds, especially in January and February. Many caterpillars attack the leaves: one of these (*Rhynchites betulae*) cuts away half the leaf and then rolls the rest of it into a neat spiral chamber in which it forms a chrysalis.[8] Many other insects injure it: one often finds galls or deformed buds like the "Big Bud" of currant, and also raspberry-red galls with insect eggs. Indeed, on July 2nd, I found in one locality, that from 60 to 80 per cent. of the leaves were damaged by insects.

Few plants support so formidable an army of parasitic fungi. The "Witches Broom," which is a mass of dead dry twigs rather like a crow's nest is due to a fungus, *Taphrina betulae*.

The fructification will be found on the underside of the leaves which are crumpled and distorted. The twig above the injured spot soon dies back; but the demand of the fungus for food material causes a flow of sugar towards the place. Any dormant bud in the neighbourhood therefore develops a twig which also is promptly killed and becomes withered as soon as the fungus reaches the spot. The fungus lives as long as its unwilling host. Nevertheless trees with 10 to 12 witches' brooms do not seem to be very much the worse,[9] and are quite vigorous.

The leaves (from August to November) are occasionally attacked by a Rust (*Melampsora betulina* Pers.). The orange-red fructifications are on the underside of the leaf; the spores formed in summer are yellow, but towards autumn one finds black or brown thick-walled spores which remain all winter on the ground and germinate in spring. They then produce tiny sporules, which are blown to the young needles of the Larch (May); the birch leaves are again infected in July or August. This interesting history is given on the authority of Grove (19). It is probable that the visit to the larch leaves in spring is optional and that it can perhaps infect Birch leaves as early as May.[10]

Three kinds of mildew also invade the leaves. The undersides may be more or less covered with fine, white or grey threads rather like a spider's web, amongst which one finds the minute black dots which are the fructifications of the fungus.[11]

Many fungi which appear in autumn attack dead and decaying leaves, but there are at least six which are specially devoted to the first stage of destruction of the dead birch-leaf.[12]

As we have seen, the arrangements for spring cleaning of the bark are of the most elaborate character, but, nevertheless, many kinds of fungi are found on the branches and trunks.

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[8] I have to thank Professor Stebbing for the identification. He says, "It does no particular harm in this country. I have seen one of the species of this genus in a village of the Western Himalayas, which completely defoliated a very valuable . . . . tree."

[9] Pith, cortex and medullary rays become enlarged and abnormal (18).

[10] I find this Rust in places 500 yards from any larch.

[11] *Microsphaera alni* DC., *Uncinula salicis* DC. and *Phyllactinia suffulta* Rab. (20).

[12] *Lachnella araneocincta* Phill; *Sphaerella harthensis* Auers; *Gnomonia emarginata* Fk.; *G. campylostyla* Fr.; *Venturia ditricha* Fr.; *Dothidella betulina* Fr.

It is impossible to draw a definite line between those which are real parasites attacking sound and healthy trees and those others which are simply breaking up diseased, dying or dead specimens.

The Polypori are, however, true parasites. The razorstrop Fungus (*P. betulinus*) forms hoof-like, semi-circular or kidney-shaped masses on the trunks: the upper surface is brownish-red. Underneath it is white with innumerable tiny pores which are covered inside by the spore-forming cells. If a spore is carried into a woodpecker's hole, or on to a freshly broken branch or by a burrowing beetle or other insect into the trunk so as to reach the living cells (or sugary sap), it will germinate there: the fine filaments of the fungus then begin to grow in the cambium, cortex or medullary rays. They can secrete ferments which dissolve both cellulose and wood (lignoses) and the whole of the centre becomes entirely rotten. Six other Polypori grow on Betula.[13]

Unfortunately it is not possible to give any adequate account here of the fifty or more Pyrenomycete fungi which attack the bark or wood of fallen branches and twigs. Some are true parasites (as, *e.g.*, *Dothidea*, which grows on the living cambium) but most manage to find a living in the bark usually between the layers of cork and it is by their efforts that the bark is eventually and at long last disintegrated.

Even the tiny birch nutlet has its own special fungus, *Apollyon*. It has been found amongst fallen leaves in May; the nutlet attacked is deformed and heart-shaped. The fungus has a small stalk with root-like hairs which ends above in a yellow or reddish saucer-like fruit some 1-4 mm. broad. The spores are pressed out as the fruit develops and thrown forcibly into the air. If they reach young green catkins, the minute nuts are infected. This has been recorded for Russia, Germany, North America and Japan, but not to my knowledge in Britain (18).

We have already mentioned the curious and mixed flora of Algae and other lowly organisms which cover the one-year-old twigs. In exposed, windy places quite a rich collection of lichens and mosses can be made on the stems and branches. In such situations, growth is difficult and the spring cleaning is not so thoroughly carried out.

At the base of the tree, *Hypnum cupressiforme*, tufts of *Dicranum scoparium*, *Polytrichum formosum* and other mosses are very common. The trunk and branches carry lichens such as *Evernia prunastri*; *Usnea ceratina*, *Platysma glaucum* and many Parmelias,[14] whilst *Lecanora tartarea* and other crust lichens are frequent on the bare cork.[15]

Now the twigs and branches of Birch are, as we have seen, remarkable for the elaborate nature of the system of bark discarding and yet they offer a field for colonisation! Sooner or later all these bark floras are, however, thrown off and when they reach the ground are broken up. Hence everything that the lichens have accumulated, mineral salts obtained from dust, organic waifs and strays left by the atmosphere as well as what they have manufactured themselves during their own brief career goes into the general reserve of the wood-soil and is utilised by the growing trees.

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[13] *P. laevigatus*, *P. pinicola*, *P. marginatus*, *P. radiatus*, *P. hirsutus* and *P. nigricans*.

[14] *P. saxatilis*, *laetevirens*, *physodes*, *caperata*, *fuliginosa*, etc.

[15] Further details will be found in an interesting paper by the late Professor W. West, who estimates the percentages of the bark covered in various cases (21).

Almost all the points mentioned above help towards an explanation of the problem of how and why Birch succeeds as a pioneer where other trees fail. Special peculiarities are that its nutlets are easily distributed and especially over snow. Its reserve of food is in the form of fat and oil and is therefore suitable to cold and exposed situations. It is hardy and adaptable, being able to vary with changing conditions. The character of its stem, branches and roots enables it to resist violent winds.

Still more important is the fact that its roots, like those of *Vaccinium*, other Ericaceae and indeed of almost all plants of peaty soil, possess a mycorrhiza or fungus-assistant, as we have already seen.

Perhaps also its extraordinary powers of absorbing water and of transpiration may be another useful quality.

APPENDIX.

Betula alba L. (*B. pubescens* Ehrh., *B. glutinosa* Fr.).

Marshy ground, wet places and peat mosses.

Tree seldom over 100 feet. Branches never drooping.

Twigs downy or covered with short hairs.

Leaves ovate, cordate or rhomboid-ovate. Acute at tip, 3-5 cm. long and 1.5-3.5 cm. broad.

Petioles at first hairy, 1-2.5 cm. long. Rather leathery in texture: veins prominent below often with hairy pockets in vein angles (due to mites).

Buds ovoid. *Stipules* ovate, blunt: length twice the breadth. *Catkins* 2.5-3 cm. long, 6-9 mm. in diameter. *Bracts* slightly hairy. *Fruit*, wings twice breadth of nutlet.

Betula alba L. (*B. verrucosa* Ehrh., *B. odorata*).

Dry ground.

Tree reaching 120 to 130 feet.

Branches sometimes drooping.

Twigs smooth, often sticky or glandular or shortly hairy.

Leaves rhomboid-ovate or almost triangular with fine drawn-out point. 4-7 cm. long and 2.5-4 cm. wide. Petioles smooth 2-3 cm. Leaves thin: veins slightly prominent above. Glabrous or when young with scattered hairs on the nerves.

Buds conical. *Stipules* ovate lanceolate acute: length three times breadth. *Catkins* 2-3 cm. long and 8-10 mm. in diameter. *Stalk* slender 10-18 mm. long.

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A FLORA OF GLAMORGANSHIRE.

(Supplement to the *Journal of Botany*, 1907.)

[The Rev. H. J. Riddelsdell has sent in the following list for my consideration. I am pleased to say that I entirely agree with his insistence on the fact that accuracy is a matter of the first importance. Twice in the 1932 *Report* (pp. 17 and 18) I refer to the need for "completeness and accuracy" in our records and the text of the *Report* bears ample evidence that no efforts have been spared to secure them. The publication of the accompanying list is therefore highly desirable.—W.H.P.]

The little book entitled *A Flora of Glamorganshire* which I published in the *Journal of Botany*, 1907, as a Supplement, was largely if not altogether passed over by the compilers of the Second Supplement to Watson's Topographical Botany (see *Journ. Bot.*, 1929 and 1930, Supplement). First records are matters of secondary importance: accuracy is a matter of primary importance. My records of 1907 show that first notices—*i.e.*, from the point of view of Topographical Botany—were then given for the following plants in v.-c. 41:—

Thalictrum dunense Dum.
Ranunculus heterophyllus Web.
R. peltatus Schrank.
R. trichophyllus Chaix.
R. Baudotii Godr.
R. lutarius Bouv.
R. parviflorus L.
Helleborus foetidus L.
Aconitum Napellus L.
Corydalis claviculata DC.
Fumaria Boraei Jord.
F. purpurea Pugsl.
Lepidium latifolium L.
Draba brachycarpa (E. praecox DC.).
Nasturtium amphibium (Armoracia amphibium Peterm.).
Brassica oleracea L.
Viola calcarea Greg.
V. sylvestris Lam.
V. lactea Sm. (V. stagnina, v.-c. 41 record, is an error).
V. lutea Huds.
Dianthus deltoides L.
Silene quinquevulnera (Alien).
Sagina apetala Ard.
S. ciliata Fr.

SPERGULA VULGARIS Boenn., omitted in *Top. Bot.*, Supp. 2.
S. SATIVA Boenn., omitted in *Top. Bot.*, Supp. 2.
SPERGULARIA RUPESTRIS (ALSINE RUPICOLA Hiern).
CERASTIUM AQUATICUM (MYOSOTON AQUATICUM Moench).
POLYCARPON TETRAPHYLLUM L.
HYPERICUM MONTANUM L.
ACER CAMPESTRE L.
ERODIUM MOSCHATUM L'Hérit.
GERANIUM PRATENSE L.
MEDICAGO MACULATA (ARABICA Huds.).
TRIGONELLA ORNITHOPODIOIDES DC.
TRIFOLIUM STRIATUM L.
T. GLOMERATUM L.
T. FILIFORME L.
LOTUS TENUIS Waldst. & Kit.
ASTRAGALUS GLYCYPHYLLOS L.
ONOBRYCHIS VICIAEFOLIA Scop.
LATHYRUS NISSOLIA L.
PRUNUS CERASUS L.
PYRUS COMMUNIS L.
EPILOBIUM LANCEOLATUM Seb. & Maur.
E. TETRAGONUM (ADNATUM Griseb.).
MYRIOPHYLLUM ALTERNIFLORUM DC.
CALLITRICHE STAGNALIS Scop.
C. HAMULATA Kuetz. (in "A Flora of Glam."; but recorded long previously).
SEDUM ROSEUM L.
S. SEXANGULARE L.
S. FORSTERIANUM Sm.
SAXIFRAGA GRANULATA L.
SMYRNIUM OLUSATRUM L.
PETROSELINUM SEGETUM Koch.
FOENICULUM VULGARE Mill.
PASTINACA SATIVA L.
GALIUM BOREALE L.
G. UMBELLATUM Lam. (G. SYLVESTRE Poll.).
VALERIANA MIKANII Syme.
VALERIANELLA CARINATA Lois.
DIPSACUS PILOSUS L.
ANTHEMIS COTULA L.
A. NOBILIS L.
PETASITES OVATUS Hill.
ARCTIUM LAPPA L. (MAJUS Bernh.).
A. NEMOROSUM Lej.
A. INTERMEDIUM Lange.
CARDUUS TUBEROSUS L.
ONOPORDON ACANTHIUM L.
CREPIS BIENNIS L.

Hypochaeris glabra L.
Pyrola secunda L.
Gentiana Amarella L.
Cuscuta europaea L.
Atropa Belladonna L.
Orobanche minor Sm.
Lathraea Squamaria L.
Utricularia neglecta Lehm.
Mentha rubra Sm.
Nepeta Cataria L.
Marrubium vulgare L.
Chenopodium Vulvaria L.
Atriplex deltoidea Bab.
A. laciniata L.
Salicornia appressa Dum.
Polygonum minus Huds.
P. maculatum Bab.
Rumex maritimus L.
R. pulcher L.
Daphne Laureola L.
Euphorbia Lathyris L. (10 years earlier than the authority quoted).
Betula pendula Roth.
Salix alba L.
S. caprea L.
S. viminalis L.
Pinus sylvestris L.
Hydrocharis Morsus-ranae L.
Liparis Loeselii Rich.
Orchis pyramidalis L.
O. mascula L.
Habenaria conopsea Benth.
Galanthus nivalis L.
Polygonatum multiflorum All. (the record given is a year later).
Convallaria majalis L.
Allium oleraceum L.
Scilla autumnalis L.
Gagea lutea Gawl.
Juncus tenuis Willd.
Luzula campestris DC.
Sparganium neglectum Beeby.
S. natans L.
Acorus Calamus L.
Lemna gibba L.
L. polyrrhiza L.
Sagittaria sagittifolia L.
Potamogeton interruptus Kit.
Ruppia maritima L.
Zannichellia palustris L.

RYNCHOSPORA FUSCA Ait. (6 years earlier than the record used: but the true record dates from an even earlier time).
CAREX DIANDRA Schrank.
C. LEERSII F. Schultz.
C. PAIRAEI F. Schultz.
C. MONTANA L.
C. BINERVIS Sm.
C. OEDERI Ehrh.
C. PSEUDO-CYPERUS L.
C. VESICARIA L.
ANTHOXANTHUM ODORATUM L.
A. PUELII Lecoq & Lamotte.
ALOPECURUS MYOSUROIDES Huds.
CORYNEPHORUS CANESCENS Beauv.
CALAMAGROSTIS EPIGEIOS was recorded even before 1907.
AVENA PRATENSIS L.
POA BULBOSA L.
P. NEMORALIS L.
P. COMPRESSA L.
GLYCERIA BORRERI Bab.
FESTUCA SYLVATICA Vill.
F. ARUNDINACEA Schreb.
BROMUS ERECTUS Huds.
B. STERILIS L.
BRACHYPODIUM PINNATUM Beauv.
TRITICUM PUNGENS Pers.
T. ACUTUM DC.
HORDEUM MARINUM Huds.
ELYMUS ARENARIUS L.
EQUISETUM MAXIMUM L., in the 1907 *Flora* and recorded prior to that.
PILULARIA GLOBULIFERA L., in the 1907 *Flora* and recorded prior to that.

The records under v.-c. 41 given in the form "Fl. 155" (as for *Colchicum autumnale*, etc.) refer to Trow's *Flora of Glamorgan* which appeared later than mine and which embodied most or all of the distribution details found in "A Flora of Glamorganshire." The *Journal of Botany* is not an obscure publication and the names of the three compilers of the 2nd Supplement to *Top. Bot.* are those of well-known and careful men. It is therefore hard to understand the occurrence of some 150 errors (mostly omissions) with respect to one county, all of which could have been put right by reference to one easily accessible publication.

H. J. RIDDELSDELL.

NOTES ON THE BRITISH ORCHIDACEAE.

Patrick M. Hall and W. H. Pearsall.

As the result of somewhat extensive enquiry and of the examination of these plants *in situ* we have acquired a considerable amount of information concerning their characters and distribution. The publication of Colonel Godfery's Monograph will no doubt have the effect of stimulating interest in this family, but it is a book for the specialist rather than the general botanist: moreover certain aspects of the subject are only more or less cursorarily dealt with, particularly the details of the distribution of the species in Britain.

For these reasons, therefore, we consider it to be an opportune moment to commence the publication in this Report of a series of papers dealing with the past and present distribution of the British members of the Order. We shall pay particular attention to contemporary knowledge as we consider that a complete, up-to-date, and accurate survey of the present position of a species is an essential preliminary condition for the further study of its future increase or decrease, and for ascertaining the causes of either. Among subsidiary objects each paper will include the correction of the corresponding section of the Comital Flora; will deal with any points which may arise as to the nomenclature or taxonomy of the genus or species concerned; and will give some similar account of their variations and hybrid offspring.

The genera will not be dealt with in taxonomic order, but it is our intention to deal first with those presenting fewer difficulties. It was with this in mind that we selected for the first paper the two allied genera, *Himantoglossum* and *Aceras*, but it immediately became apparent that each had its own problems of nomenclature and taxonomy: further, the collection of accurate and authoritative information with regard to the *present* distribution (as opposed to the historical distribution) of a well-known, though comparatively scarce, species is by no means easy.

This, therefore, is an appropriate time at which to acknowledge the ready assistance given to us by the authorities of the national museums, the curators of many county and civic museums, and also by a very large number of correspondents, for the most part members of this Society. We wish especially to thank Dr T. A. Sprague of Kew for his help in matters of nomenclature, to which fuller reference is made below.

I.

Himantoglossum hircinum Koch.

NOMENCLATURE.

It will be seen from the above heading that the name which we propose to adopt for this species is a departure from usual practice. Recent authorities have employed three different generic names, viz., *Orchis* L., *Loroglossum* Rich., and *Himantoglossum* Spreng.: of this varying usage the following are illustrations:—

Druce, *Br. Pl. List*, 2nd ed. (1928), 109, gives 669/18 *Orchis* (Section *Loroglossum*) *hircina* Crantz.

Druce, *Com. Fl.* (1932), 285, gives *O. hircina* (L.) Crantz, with synonyms *Loroglossum hircinum* Rich. and *Himantoglossum hircinum* Spreng.

Rouy, *Fl. Fr.*, xiii, 182, and Camus, *Iconographie des Orch. d'Eur.*, i. 118, both adopt the name *Loroglossum hircinum* Rich.

T. and T. A. Stephenson, *Lond. Cat.*, 11th ed. (1925), 42, list *Himantoglossum* Sprgl. as genus No. 407 with species No. 1801 *hircinum* Sprgl.

Godfery, *Mon. and Icon. Br. Orch.* (1933), 158, adopts *Himantoglossum hircinum* Sprengel; his reasons for rejecting the earlier *Loroglossum* Rich. are not explicit but are apparently based on the inclusion of *Aceras* in that genus.

Orchis L. being inadmissible on taxonomic grounds (see below), we referred the respective claims of *Loroglossum* and *Himantoglossum* to Dr Sprague and quote his reply *in extenso* as follows:—

"The earliest legitimate generic name available for the Lizard Orchis appears to be *Himantoglossum* Koch. Syn. ed. i, 689, 841 (1837). *Loroglossum* Rich. (1818) included *Aceras* R. Br. (1813) and *Loroglossum* Rich. was therefore illegitimate, since it was a superfluous name for *Aceras*. *Himantoglossum* Spreng. (1826) was illegitimate for exactly the same reason. *Himantoglossum* Koch did *not* include *Aceras* and was therefore neither superfluous nor illegitimate. One might hastily have concluded that it was a *later homonym* of *Himantoglossum* Spreng. and was therefore illegitimate. But the definition of a later homonym is a name which 'duplicates a name previously and validly published for a group of the same rank *based on a different type*' (the italics are mine). The type-species of both Himantoglossums is *Satyrium hircinum* L. Hence *Himantoglossum* Koch is *not* a later homonym. Of course if it were found that *Loroglossum* had been used previously to *Himantoglossum* for the Lizard Orchis and its allies (but excluding *Aceras*), then *Loroglossum* would have precedence, but we do not find any such previous use. Hence *Himantoglossum* Koch should be adopted. . . . N.B.—The incorrect spelling *Himanthoglossum* used in Koch *Syn.*, 689, was corrected to *Himantoglossum* on p. 841 (index)."

This appears to us to be a particularly neat solution of the problem, retaining the familiar name and involving only the minor change of the authority, instead of necessitating the major change to an unfamiliar, or even possibly an entirely new, name. We propose, therefore, to adopt the name *H. hircinum* (L.) Koch for this species.

TAXONOMY.

The taxonomic position of the genus *Himantoglossum* is uncertain. Although the conformation of the column and pollinia closely resembles that of *Orchis*—so closely, in fact, that an inter-generic hybrid has been recorded from France—yet there is an important distinction between the two genera in the fact of *Himantoglossum* having both pollinia attached to one viscidium, while in *Orchis* the viscidia are separate. If Godfery's very reasonable theory is accepted (that evolution in the Orchidaceae is in the direction of perfecting the methods adopted for the preservation and economical removal of the pollinia), *Himantoglossum* is a more ancient type than *Orchis*. It is prebable, however, that *Himantoglossum* is not in the direct line of descent of *Orchis*, the latter being more closely connected with the *Gymnadeniinae*. While it is not impossible that the single viscidium of *Himantoglossum* arose from the coalescing of the two viscidia of *Orchis*, in the same way that *Anacamptis* with a single viscidium appears to be a direct descendant of *Gymnadenia conopsea* with two viscidia, Godfery believes *Himantoglossum* together with the Southern European genera *Barlia* and *Serapias*, which also have a single viscidium, to be on a separate line of descent parallel to that of *Orchis*. In order not to disturb the sequence from the *Gymnadeniinae* to *Orchis* and at the same time to bring out the affinities between *Orchis* and *Himantoglossum*, we suggest that the most convenient position for the latter is immediately following *Orchis*.

POLLINATION.

There is little to be said on this point, as in general the mechanism for cross-fertilisation is similar to that of *Orchis*, except that the pollinia are attached to one viscidium. It is worth mentioning that on only one occasion have the visits of insects to this species been recorded in Britain, when a railway employee observed the visit of a wasp-like fly, *Odynerus parietum*, but the removal of pollinia was not observed. Colonel Godfery has seen the removal of pollinia by hive-bees in France. Further records of insect-visitors to this species would be valuable.

DISTRIBUTION IN BRITAIN.

We give here only a summary of a large mass of data collected in regard to this species. A list has been prepared, as complete as it could possibly be made, of all the authenticated occurrences of the species in this country. It is not considered advisable that this information should be published but copies of this list have been made and deposited in the principal Herbaria. A further reason for publishing here only a summary is that much of the information regarding this species was obtained in collaboration with Mr R. D'O. Good of University College, Hull, and will be used by him in a forthcoming paper on the relation of *H. hircinum* to certain theories of plant-geography.

The text-books dealing with the vice-comital distribution of British plants differ widely in their treatment of this species:—

Lond. Cat., 11th ed., 1925,	16.
Brit. Pl. List, 2nd ed., 1928,	Eng. 10. Jersey.
Com. Fl., 1932,	Eng. 22 (H. error). Jersey. 6-8, 11-17, 20, 22-25, 27-29, 33, 34, 54, 55.

As the result of our investigation we find that the distribution given in the *Comital Flora* should be corrected to read as follows:—

Eng. 24 (6). Jersey. 6-17, 20, 22-25, 27, 29, 30, 33, 53-5.
(Errors. 26 in *Herb. Druce* for 25.
28, 34 in *Comital Flora.*
56, 57, 70 in *Topographical Botany*, ed. II.
H. 9 in Wade's "Plantae rariores in Hibernia inventae.")

In all *H. hircinum* has been recorded from not less than 99 separate localities in the 24-vice counties in addition to Jersey and it is significant that the species has been seen in 76 of these localities (and in Jersey) since 1900. It should be pointed out that the total number of occurrences is very much greater than 99, as in many localities the plant has been recorded many times; for example, in the N. Somerset locality it has been seen annually since discovery in 1923. The number of occurrences since 1900 would represent an even greater proportion of the total than in the case of localities.

It will seem somewhat remarkable at the present time that the authors of the *Flora of Kent*, published in 1899, should have said of this species "now verging on extinction," but that was undoubtedly endorsed by every botanist at that time and for several years subsequently. It seems that the species was not infrequent in W. Kent in the vicinity of Dartford at the end of the 18th and beginning of the 19th centuries but later became extremely rare in Kent and was practically unknown in other counties. So that, for example, in the *Flora of Hants*, 2nd ed., 1904, Townsend excluded as erroneous a record of this species from St Mary Bourne, N. Hants, c. 1866: few species can be so free as this from errors of identification and in the light of modern knowledge there seems to be little reason for rejecting such a record.

Kent is the headquarters of this, as indeed it is of other Orchidaceous species in Britain, nearly one half (45) of the total number of recorded localities being in that county: of the localities in which the plant has been seen since 1900, 26 (or 34%) are in Kent. But whereas of the total 45 Kentish localities 29 are in East and 16 in West Kent, of the 26 post-1900 localities only 2 are in West Kent.

The following table summarises the data in regard to relative frequency in the various vice-counties and also gives the dates of the first and latest records. As far as we have been able to ascertain, *H. hircinum* was seen in no less than 12 British localities in 1933, viz.:—N. Somerset, Dorset, Isle of Wight, W. Sussex, E. Sussex, E. Kent (4 separate stations), W. Kent, Oxford, and Jersey. The statement in the *Comital Flora* "increasing its range" is clearly justified: speculations as to the reason for this increase we leave to Mr Good. Even though this species may be spreading, it must be borne in mind that in point of numbers it is exceedingly scarce: the largest colony in Britain, of which we have been able to find evidence, numbered 27, while in an overwhelming number of cases the records refer to a single plant having been found.

Vice-county.	Total number of recorded localities.	Number of localities recorded since 1900.	Date of first record.	Date of latest record.
6	1	1	1923	1933
7	2	2	1907	1931
8	4	4	1907	1929
9	2	2	1923	1933
10	1	1	1933	1933
11	5	5	1925	1931 2 locs.
12	5	3	c. 1866	1950
13	4 (at least)	4 (at least)	c. 1850	1933
14	6 ,,	6 ,,	1911	1933
15	29 ,,	24 ,,	ante 1796	1933 4 locs.
16	16 ,,	2	1641*	1933
17	8	7	1821	1931
20	1	1	1931	1931
22	1 (or 2?)	1 (or 2?)	1921	1931
23	2	2	1920	1933
24	1	1	1931	1931
25	3	2	1847	1926
27	1	1	1923	1923
29	2	2	1921	1924
30	1	1	1932	1932
33	1	1	1917	1925
53	1	1	1931	1931
54	1	1	1929	1930
55	1	1	1931	1932
Jersey	1	1	1918	1933
	100	77		

* First record for Britain.

Aceras anthropophorum (L.) R. Br.

NOMENCLATURE.

As in the case of the previous species, it has been necessary to make a slight change from the name in general use. In the paper on Plant Nomenclature written by Dr Sprague in the 1932 *Report*, he referred on p. 301, §2, to the method by which the gender of generic names is determined. *Aceras* is not a Greek or Latin word, but a modern compound, formed from two Greek words, *a* and *keras*, the second of which is neuter in gender; the compound name therefore has to be treated as neuter also.

TAXONOMY.

Godfery, *Monograph*, p. 160, shows quite conclusively that *Aceras* has two viscidia and that the pollinia can be separately detached from the anther, although many Continental authorities, including Schlechter and Keller and Camus, have described it as having one viscidium only. In this connection it is noteworthy that, although the Continental authorities, who place *Aceras* with one viscidium, accept that name given to the genus by Robert Brown, yet Brown's original description differs from their rendering of it. Mr Summerhayes of Kew has kindly supplied us with Brown's original generic description, as follows:—"Cor. ringens. Labellum ecalcaratum. Glandulae pedicellorum pollinis cucullo communi inclusae." The use of the word "glandulae" makes it clear that Brown considered the genus to have 2 viscidia and not a single viscidium, which Mr Summerhayes has confirmed by the examination of spirit material. This point is of some importance as it removes all doubt as to the validity of the name *Aceras* on that score.

The absence of a spur is therefore the only structural distinction between this genus and *Orchis*. In general conformation and in the common possession of coumarin, it is clear that *Aceras* is very closely related to *Orchis simia* and it has been included in *Orchis* by some authorities, *e.g.*, Allioni. In *Aceras* the nectary is replaced by two shallow depressions at the base of the labellum and we consider that this in conjunction with the entire absence of spur is sufficient to differentiate *Aceras* from *Orchis*, in which the spur is no longer a true nectary but secretes liquid between the inner and outer walls of tissue. *Aceras*, in our opinion, is best regarded as a rather more primitive genus than *Orchis* and as such should be placed taxonomically next to, and immediately preceding, *Orchis*.

VARIATION.

The range of variation in this species is very small and such forms and varieties as have been described by Continental botanists differ from the type only in minor details such as stature, coloration, and shape of the labellum. British specimens vary to some extent in colour, which ranges from pale straw-yellow to reddish brown more or less suffused with green; occasionally specimens will be found growing with the type which lack the narrow red edging of the perianth segments; these come under f. *flavescens* Zimm. In *Herb. C. E. Salmon* in the British Museum Herbarium is a specimen sent by F. H. Elsley from Hackhurst Downs, Gomshall, Surrey, to which the following note is attached:—"This is, I believe, rather a rare specimen of *Aceras*. It is the var. *fulva* without a brown edge to the flowers and is very interesting," to which Salmon added "many specs. on Colley Hill seem identical." In the same Herbarium there is a sheet from Colley Hill, Surrey, gathered by Salmon himself and dated 21.6.1919, on which appears the note "and many are the var. *fulva*." We have not been able to trace any form or variety of this name but it is clearly the same as f. *flavescens* Zimm.

POLLINATION.

Godfery refers to two observations of visits by insects. In one case in France ants visited flowers and removed pollinia; in the other case observed in this country flies attacked aphides on spikes of *Aceras* and in so doing removed pollinia. In the latter case the plants were in a green-house and conditions were therefore unnatural. No visits have been recorded in Britain in a state of nature.

TIME OF FLOWERING.

Aceras is an earlier-flowering species than is generally realised. The text-books give June (Babington's *Manual*), and June-July (Godfery and *Hayward's Pocket Book*); in southern England in an average season the plant is in good flower by mid-May and is past its best by mid-June.

DISTRIBUTION IN BRITAIN.

The vice-comital figures given by the three standard British lists are as follows:—

London Catalogue, 11th edition (1925),	23.
British Plant List, 2nd edition (1928),	Eng. 20 (3).
Comital Flora (1932),	18 (5).

6, 10, 12-19, 25-30, 32, 63. Errors 20, 22, 24, 33, and 54.

All three authorities, therefore, are in agreement as to the total number of vice-counties, but differ as to the number considered to be erroneous.

From the evidence which we have examined in the form of published records, specimens in public and private herbaria, and communications from a large number of correspondents, we find that the appropriate section of the *Comital Flora* should be emended to read as follows:—

Eng. 17. ⟨3⟩. [9]. 10-17, 19, 20, 25-30, 32.
⟨Extinct. 6, 18, 23⟩.
[Doubtful or errors. 3, 7, 8, 22, 24, 33, 54, 55, 63].

This distribution is a remarkably close parallel to that of *Himantoglossum*; each has a single recorded station in the Isle of Wight, each extends to a single station in N. Somerset (unfortunately now eradicated in the case of *Aceras*), while the northern limits reached—Lincolnshire in one case, Northampton and Norfolk in the other—are approximately similar.

While, however, as we have shown, there is reason to believe that *Himantoglossum* is increasing its range, the evidence in the case of *Aceras* points to the reverse. Numerically, of course, *Aceras* is by far the more abundant of the two species; a very large proportion of the recorded occurrences of *Himantoglossum* are of single individuals, in exceptional cases colonies of 20-30 plants have been recorded, whereas in the stations where *Aceras* thrives colonies of some hundreds of individuals may still be seen. Although in many places *Aceras* is still abundant, yet looking at its distribution in Britain generally, it must be said that it is decreasing and has disappeared from a large number of its localities. This is especially true of the Eastern counties and parts of Kent and Surrey. In the case of the two latter counties this decrease is no doubt due to suburban expansion but in the Eastern counties the cause probably lies in the great increase of arable farming in the early years of the 19th century. Though there are large areas of chalk in Essex, Suffolk, Norfolk and Cambridgeshire, the terrain is much flatter than in the case of the downland of southern England; the depth of overlying soil is in consequence greater and larger areas were converted to arable. On the steeper North and South Downs there still remained large areas suitable to the needs of *Aceras* and in parts of these it holds its own and indeed in some instances seems to be increasing. Generally speaking, in Britain at least, *Aceras* is confined to the short turf of chalk downs, the floors of chalk-pits and roadsides but there are records of occurrences in open woods: the now extinct Somerset locality was on the carboniferous limestone, while in Northamptonshire the species grows on limestone as opposed to chalk.

We give below a summary of the data collected with regard to the past history and present circumstances of the species, arranged in vice-comital order:—

WIGHT (10). First recorded from near Shanklin by Mr E. H. White in 1905; see *Journ. Bot.*, 1905, and Rayner, *Supplement to the Flora of Hants*, 1929, 103. Still exists in one locality only, very scarce indeed, never more than about a dozen plants.

S. HANTS (11). First recorded from Exton in 1922 by Miss Davidson. This and two other localities are given by Rayner, *l.c.*, and one more locality was added in 1930; see *Rep. B.E.C.*, 1930, 450. Still exists and appears to be increasing (see note below).

N. HANTS (12). First recorded from East Woodhay in the extreme north of the county, c. 1849, by Mrs Cardew. This and two other early records are given by Townsend, *Flora of Hants*, 2nd Edition, 1904, 405. Also found near Winchester in 1910; see *Rep. B.E.C.*, 1922, 748; now extinct in this locality. Near Steep, 1925, Browning in Rayner, *l.c.*, is the most recent record we have been able to trace; it probably still exists in this area.

Note as to occurrences in v.-cs. 10-12.—Twenty-five years ago this species was practically unknown in Hants. There were three very old records for N. Hants, and the late Canon Vaughan and a very few other botanists knew the Shanklin locality. The Winchester (v.-c. 12) locality was discovered in 1910, not in 1907 as stated by Rayner; Vaughan's 1907 plants in *Herb. Druce* described as from "Salchett Downs" were probably from Shanklin: Vaughan did not see the plant on the mainland of Hants until 1911, when the Winchester locality was shown to him by one of the present writers. No other locality was known before 1922, since when five new localities have been discovered. In one of these, Exton, the plant is abundant; Exton is less than four miles from Droxford and it is unbelievable that such a botanist as Canon Vaughan, when Rector of Droxford, could have overlooked this plant, if it then grew at Exton in such numbers as it does at the present time. There is thus reason to suppose that in Hants this species is spreading.

W. SUSSEX (13). First recorded from Westergate, before 1843, by Tyacke; see Arnold's *Flora of Sussex* for this and other early records. Has been recorded from at least seven localities in all; three of these are recent records, and in one locality at least the plant is plentiful.

E. SUSSEX (14). Arnold, *l.c.*, gives several early records; first dated record from near Chailey, 1863, Edwards in *Herb. Roper*. Recorded from nine localities in all; four are recent records and the plant still exists in the Eastbourne district.

E. KENT (15). Hanbury and Marshall, *Flora of Kent* (1899), state "frequent in districts 5, 6 and 7," and also give localities in districts 4, 9 and 10. The earliest dated herbarium specimens which we have seen are from Deal, 1835, E.M., ex *Herb. S. O. Gray* in *Herb. Univ. Manc.* The *Floral Guide for East Kent* (1839) gives four localities. In all the species has been recorded from at least twenty localities; by the word "locality" we mean groups of stations in the same neighbourhood, as for example the locality "near Wye" may and does cover more than one actual station. There is reason to suppose that the plant has much decreased in recent years but still exists in at least ten localities; we have recent records from Maidstone, Wye !, Dover and Folkestone area ("occasional specimens," J. Jacob), Nonnington, Barham ("scarce," J.J.), Chilham ("fairly abundant," J.J.), Wingham ("decreasing," J.J.), Sittingbourne, and Harrietsham.

W. KENT (16). *Flora*, "frequent in district 2," *i.e.*, in the Dartford-Rochester area. First record at Greenhithe and Northfleet, 1724, Sherard in Ray. *Syn.*, ed. 3, 379. The earliest herbarium specimen we have traced is from Wrotham, 1774, Banks in *Herb. Mus. Brit.* Herbarium specimens from W. Kent localities dated in the first half of the 19th century are frequent but later examples are fewer. In all we have notes of thirteen locality-areas but it is clear that the species has decreased very much in recent years, especially in the north-western part of the vice-county; there are recent records in five localities only, viz.:—Cuxton, Shoreham, Dunton Green, West Malling (two stations, abundant, 1933 !), and Halling.

SURREY (17). There are numerous early records; the earliest dated herbarium specimens we have traced are from Croydon, c. 1798, Dickson in *Herb. Mus. Brit.* A very large number of herbarium specimens occur from Surrey localities; for example, in *Herb. C. Bailey* in Manch. Univ., there are no less than ten sheets from Boxhill alone. The species has been recorded from at least twenty locality-areas, from fifteen of which we have recent records; in many of these in spite of severe collecting throughout the last 100 years, the plant is still frequent; in fact it is only in the localities nearest to London, *e.g.*, Croydon, that the plant has disappeared. It is still very frequent in the Dorking-Boxhill-Reigate area and the statement in Salmon, *Flora of Surrey*, 1933, 601, "probably more abundant in Kent than in any other county," is truer to-day of Surrey.

N. Essex (19). The first record is also the first record for Britain—Dallington (=Ballington), Ray, *Syn.*, 1690, 171; there are specimens from this locality dated 1715 in *Herb. Samuel Dale* (1659-1739) in *Herb. Mus. Brit.*; there are also specimens in the same herbarium from Belchamp St Paul and Walter Belchamp. There is only one recent record, Terling, near Witham, 1909, E. E. Turner in *Herb. Druce.* It is doubtful whether the plant still exists in v.-c. 19.

Herts (20). Very rare indeed, one locality only in which six plants were seen in 1931.

E. Suffolk (25). First dated record, near Bungay, 1840, D. Stock in *Herb. Kew* and *Herb. C. Bailey*; five recorded localities in all, of which two are recent. In one of these at least, near Ipswich, there is still a colony of about 80 plants. Decreasing in Suffolk, teste F. W. Simpson.

W. Suffolk (26). First dated record, Chilton gravel-pit, 25/5/1744, in *Herb. J. Andrews* in *Herb. Mus. Brit.*; there are also early records from Hadley, Stanton, Rougham, Great Barton and Hitcham. There are recent records from Whepstead (1911) and Nedging, in which locality the plant still exists in three stations but not in large numbers.

E. Norfolk (27). Nicholson, *Flora of Norfolk*, 1913, 145, gives eight localities in this v.-c.; the earliest dated record is from Forncett, 1799, and there are specimens from here dated 1803 in *Herb. Kirby* in Ipswich Museum. We have not traced any other herbarium specimens from v.-c. 27. Nicholson, *l.c.*, states "rare," and it is very doubtful whether the plant still exists. Seven of the eight localities given were in the Wymondham-Diss area and the plant should be looked for in this district.

W. Norfolk (28). The earliest dated record is Narford, 4/6/1849, B. D. Wardale in *Herb. Kew*, Mus. Brit., and Reading Univ. Nicholson, *l.c.*, gives three other localities, one of which—Thetford—is recent, with specimens dated 1912 from F. C. Newton in *Herb. Leeds Univ.* Present existence doubtful.

Cambs (29). Babington, *Flora of Cambridge*, 1860, 226, gives eight localities, in one of which only has the plant survived to recent times. There are specimens dated 7/6/1927 in *Herb. W. J. Sledge.* The first dated record is Linton, 1803, in *Herb Kirby* in Ipswich Museum.

Beds (30). Very sparingly in one locality only: first and only record Totternhoe, 1926, J. Douy: see *Rep. B.E.C.*, 1926, 135: specimen in *Herb. Druce.*

Northants (32). Has been recorded from ten localities in all. The first dated record is Helpstone, 1820, in *Herb. Kew* without collector's name. This antedates by 30 years the earliest record in Druce's *Flora*, Barnack, c. 1850. There are recent records from seven localities, viz.:—Barnack, Colleyweston, East Haddon, Bedford Purlieus, Southorpe, Swordy Well, and Helpstone. The plant is still plentiful at Barnack, whence it was distributed through the B.E.C. in 1914, and has been seen in at least one other locality in 1933.

EXTINCTIONS.

N. Somerset (6). One record only, on carboniferous limestone between Portishead and Clevedon, c. 1892; see J. W. White in *Journ. Bot.*, 1907. There is an interesting account of the eradication of the plant from this locality in White's *Flora of Bristol*, 1912, 560; see also W. D. Miller in *Rep. B.E.C.*, 1932, 270.

S. Essex (18). This v.-c. appears in *Top. Bot.*, without personal authority and is also given in *Com. Fl.* The only record we have been able to trace is in G. S. Gibson's *Flora of Essex*, 1862, "South Shoebury Common, 1835, F." There is a sheet in *Herb. Mus. Brit.* gathered by E. Forster in 1835 marked "below South-End, non South Shoebury Common."

Oxon (23). Druce, *Fl. Berks*, 1897, 477, states "recorded for Oxon on unsatisfactory authority" and in *Fl. Oxon*, 1927, 411, "very rare if correctly named." It is suggested that this species was confused with *Coeloglossum viride* and is excluded as an error. There are, however, specimens from Mapledurham, June 1853, J. T. Syme in *Herb. Mus. Brit.*

DOUBTFUL AND ERRONEOUS RECORDS.

S. Devon (3). There is a sheet in *Herb. Univ. Manc.*, ex *Herb. E. A. Lomax*, which purports to be from "railway bank, near Torquay, June 1873." The sheet, however, contains only one complete specimen of *Aceras*; 2 roots and leaf-rosettes of *Aceras*; and 2 inflorescences of *Listera ovata*, one of which is stuck into *Aceras* leaves to give the appearance of a complete plant. The *Listera* spikes are ringed round in pencil and marked "*Listera cordata*" (sic). There is also in the Manchester Museum a sheet of *Listera ovata* from Guildford as well as sheets of *Aceras* from Guildford, both ex *Herb. E. A. Lomax*, and this is probably the source of the error.

N. Wilts (7). Preston, *Fl. Wilts*, 1882, 192, says "2 spec. found at Clyffe Pippard, c. 1868: also reported from 2 stations (both woods) near Corsham: doubtful." Druce, *Fl. Berks*, *l.c.*, "recorded from Wilts on unsatisfactory authority."

S. Wilts (8). Two verbal reports to Miss Gullick of Salisbury of occurrences near Warminster, in which district the plant possibly occurs, and should be looked for.

Berks (22). Given in *Top. Bot.*, 2nd edition, without personal authority, and in *Com. Fl.* in brackets. Druce, *Fl. Berks*, *l.c.*, says "near the road from Wallington to Reading by Mr Browne, in Merrett's *Pinax* 1666;" suggested confusion with *Coeloglossum viride* and excluded.

BUCKS (24). Given in *Top. Bot.*, 2nd ed., without personal authority, and in *Com. Fl.*, in brackets. Druce, *Fl. Berks*, *l.c.*, says "recorded for Bucks on unsatisfactory authority," and in *Fl. Bucks*, 1926, 332, gives one record, c. 1867, near Wendover, Rev. H. Harpur-Crewe. Very doubtful.

E. GLOSTER (33). This appears in *Com. Fl.* in brackets but we have not been able to trace on what this is based. Error.

N. LINCS (54). Appears in *Com. Fl.* in brackets. "Plentiful in Gate Burton Wood," Wollaston, in *Phyt.*, 1843, 543; see also Lees in *Science Gossip*, 1870, 189 and 211. Omitted by Woodruffe-Peacock from his *List of Lincolnshire Plants* as an error for *Listera ovata*.

LEICESTER (55). Reported from Wardley Wood, Uppingham, by H. Candler, but bracketed as an error by Horwood in *Flora of Leics. and Rutland*, 1933, 532.

S.W. YORKS (63). Lees in *Flora of W. Yorks*, 433, gives two records but excludes as an error. Included in *Top. Bot.*, 2nd ed., from Hampole Wood, Doncaster, on authority of Mrs Broadrick. Included in *Com. Fl.*, not in brackets.

SOME HYBRID CARICES.

W. H. Pearsall.

Below we give for each of the British species of *Carex* the names of the other species with which it is known to hybridise. The asterisk denotes that this hybrid has been recorded for Britain. An examination of this list will suggest many problems, to only two of which we may briefly refer: 1. Why do some species apparently not hybridise at all? 2. How is it that some species found growing together in abundance never hybridise?

1. Among the commoner species not known to hybridise in Britain are the following: *pulicaris, pauciflora, disticha, divisa, capillaris, strigosa, humilis, depauperata, sylvatica, helodes, pendula, pallescens.* *C. pulicaris* is frequently found within easy distance of *C. dioica* but whereas the latter hybridises occasionally with *incurva, lagopina, canescens* and *stellulata*, it does not do so with *pulicaris, flacca, ovalis* and *pauciflora*, which are usually more frequent in its immediate neighbourhood.

C. sylvatica, helodes, pendula and *pallescens* have always other species in their vicinity but do not hybridise with any of them.

2. Even more difficult to understand are cases such as these. In a wood near my house *sylvatica* and *helodes* grow in abundance within a few yards of each other but never hybridise. In an adjacent wood which is very wet, *pendula* and *paniculata* are dominant in close proximity over large areas but although I have searched diligently I have failed to find any trace of hybridity. Similar cases will be within the recollection of most botanists. The following list may be useful for reference and for economy of effort when searching for hybrids.

I.

DIOICA—*incurva, lagopina, canescens, stellulata.*

II.

ARENARIA—*remota.*

INCURVA—*dioica.*

VULPINA—**paniculata, *remota, *contigua.*

CONTIGUA—*stellulata, divulsa, *remota, *vulpina.*

DIVULSA—*contigua, ovalis, *remota, *vulpina ?.*

DIANDRA—*paniculata, paradoxa.*

PARADOXA—*paniculata, diandra, canescens, remota.*

PANICULATA—*stellulata, elongata, diandra, paradoxa, canescens, *remota, *vulpina.*

REMOTA—*arenaria, *contigua, *vulpina, *paniculata, paradoxa, ovalis, canescens, elongata, stellulata, *divulsa.*

STELLULATA—*dioica, canescens, remota, contigua.*

ELONGATA—*paniculata, canescens, remota.*
CANESCENS—*dioica, paniculata, lagopina, elongata, remota, stellulata.*
OVALIS—*remota, divulsa.*

III. A.

HUDSONII—**Goodenowii,* **gracilis,* **aquatilis.*
RIGIDA—**Goodenowii,* **aquatilis.*
GRACILIS—**Goodenowii,* **Hudsonii.*
GOODENOWII—**rigida, trinervis,* **aquatilis,* **gracilis,* **Hudsonii, flacca.*
AQUATILIS—**rigida,* **Goodenowii,* **Hudsonii.*
ALPINA—*atrata.*
LIMOSA—*magellanica, rariflora.*
MAGELLANICA—*limosa, rariflora, panicea.*
RARIFLORA—*limosa, magellanica.*
PANICEA—*flacca, magellanica, Hostiana, vaginata.*
FLACCA—*Goodenowii, montana, tomentosa, panicea,* **acutiformis, flava.*
DIGITATA—*ornithopoda.*
CARYOPHYLLEA—*ericetorum, pilulifera.*
ERICETORUM—*caryophyllea, pilulifera, montana.*
PILULIFERA—*ericetorum, caryophyllea, montana.*
MONTANA—*ericetorum, pilulifera, flacca.*

III. B.

HOSTIANA—*panicea, distans,* **flava,* **lepidocarpa,* **Oederi.*
PUNCTATA—**Oederi.*
DISTANS—*Hostiana, flava, lepidocarpa.*
BINERVIS—*Oederi, flava ?, rostrata.*
EXTENSA—*Oederi.*
OEDERI—*binervis,* **punctata,* **Hostiana, extensa, flava, lepidocarpa.*
FLAVA—*distans,* **Hostiana, lepidocarpa, Oederi, flacca, binervis ?.*
LEPIDOCARPA—*distans,* **Hostiana, flava, Oederi.*
PSEUDO-CYPERUS—**rostrata,* **vesicaria.*
ROSTRATA—**Pseudo-cyperus,* **vesicaria,* **riparia,* **lasiocarpa,* **hirta.*
VESICARIA—**Pseudo-cyperus,* **rostrata,* **riparia,* **lasiocarpa,* **hirta.*
ACUTIFORMIS—*flacca,* **lasiocarpa,* **gracilis,* **rostrata,* **riparia.*
RIPARIA—**lasiocarpa,* **rostrata,* **vesicaria,* **acutiformis.*
LASIOCARPA—**rostrata,* **vesicaria,* **acutiformis,* **riparia.*
HIRTA—**rostrata,* **vesicaria.*

With regard to recognised hybrids the request for descriptions of these is hard to resist but more difficult to meet. It cannot be too often emphasised that the hybrids between two given species may differ greatly in their appearances and characters. They differ between the extreme limits of the characters of two very different species and any comprehensive description of them would be so vague as to be valueless. Where descriptions of a hybrid have been compiled it is usually because one of the parents is so much more vigorous than the other that its influence is normally predominant, and that particular form of the hybrid the one most frequently found, but it is always necessary to remember that even in such a case we may occasionally come across a hybrid between the same two species showing the predominant influence of the other parent. The danger of depending upon hybrid descriptions is therefore very real. When your suspected hybrid agrees in the main with a published description all may be well, but to assume that because your plant does *not* agree with the description it cannot be a hybrid between the same two species is absurd. The hybrids between any two Carex species are usually separable into at least two distinct and very different classes—those in which the evidence for one parent species predominates, and those in which the influence of the other parent is the more apparent. Many continental authors realise this and differentiate in their descriptions and names accordingly.

In my previous paper (*Rep.*, 1932, 174-5) I give two descriptions of hybrids included in Bab. (*Man.*, 458) as species. Herewith I add several others having some bearing on the point raised above and also on plants distributed this year.

C. ROSTRATA × VESICARIA.

1. (Nearer to *vesicaria*).
   C. PANNEWITZIANA Figert in *Deutsch. bot. Monatsschr.*, v (1887), 97. Habit of *C. rostrata* but with broader ls., 4-5 mm. wide, flat or nearly so, green and grass-like, often exceeding the stem. Sp. broad and densely flowered. Fruits broadly ovate or ellipsoid with rounded bases; larger than those of *rostrata* and strongly inflated; ± abruptly narrowed into a moderately long neck and deeply bifid beak; normally sterile. Gl. long, narrow and acute, subequal to the fruit or slightly shorter.

2. (Nearer to *rostrata*).
   Var. SUPER-ROSTRATA Kneucker in *Allg. bot. Zeitschr.*, vii (1901), 33. Ls. narrower, margins ± involute: more glaucescent. Sp. narrower and longer. Gl. more often subacute or obtuse. Fruits similar. Less frequent than the preceding.

C. PANICULATA × REMOTA.

×C. BOENNINGHAUSENIANA Weihe in *Flora*, ix (1826), 743. Beckmann et Figert in *Verh. bot. Ver. Brandenburg*, xxxii (1891), 272, distinguish two forms of this:

3. (Nearer to *paniculata*).
   Var. PER-PANICULATA Beckm. et Fig., *l.c.* Habit of *C. remota* but larger and more robust, angles of stiffer stem acute and very rough, especially in the upper half. Inflorescence ± paniculate and strict. Ls. broader, as in *paniculata*. Spikelets lanceolate, greenish. Lowest bract equalling the stem. Gl. rusty brown with broad silvery margins. Otherwise as described in *Rep.*, 1932, 175.

4. (Nearer to *remota*).
   Var. PER-REMOTA Beckm. et Fig., *l.c.* A much more slender plant, with stem less rough and inflorescence long, very flaccid and sub-

spicate. Sp. smaller, plainly distinct and the lowest very remote. Lowest bract very long, often exceeding the stem. Gl. much paler.

C. REMOTA × VULPINA.

5. ×C. AXILLARIS Good. (See description, *Rep.*, 1932, 175). This is by far the more common form of this hybrid and is much nearer *vulpina*.

6. Var. REMOTOFORMIS Rouy (*Fl. Fr.*, xiii, 423) is nearer *remota*. It is the *C. Kneuckeriana* Zahn in *Österr. bot. Zeitschr.*, xl (1890), 412, and is a more slender and smoother form with weak stem and flaccid narrower leaves. Panicle less interrupted below. Fruits attenuate below. Gl. usually paler.

A LIST OF GLAMORGAN PLANTS.

E. VACHELL, F.L.S.

The following list of Glamorgan plants follows, in most cases, the nomenclature of the "British Plant List," Edition 2, published in 1928 by Dr G. C. Druce, including the additions and corrections that have since appeared in the "Reports of the Botanical Society and Exchange Club of the British Isles."

All plants recorded for Glamorgan, v.-c. 41, that appear in the "British Plant List" as native species, denizens, or naturalised aliens, printed in black type, black type with asterisk, or starred italics respectively, whether native or adventive in the county, have been as far as possible included, but about 200 dock and grain aliens, appearing in the "British Plant List" printed in unstarred italics have been purposely omitted with the exception of a few that are more or less established in the county, or are included in "The London Catalogue" of Plants, Sowerby's "English Botany," Bentham's "British Flora," or "Further Illustrations of the British Flora" by Dr Butcher, and may therefore be considered of interest to field botanists visiting the county. Being a list and not a Flora, the plan of including aliens with the native species adopted in the "British Plant List" has been followed, but local conditions make it almost impossible to follow the list too strictly as regards the starring of aliens, as in this respect every county has different difficulties to contend with. Also, as it is only a list it seems unnecessary to adhere to the practice generally adopted in Floras of giving priority to the oldest records, and therefore the most modern ones have where possible been quoted in preference, as likely to provide the more useful information to field botanists desirous of seeing, *in situ*, plants still occurring in the county.

The extensive coast line, high hills and varied geological features make the native Flora of Glamorgan an unusually rich and interesting one, while important sea ports on the shores of the Bristol Channel are responsible for an exceptional number of adventive species. When vessels were built to carry water ballast instead of sand, alien plants would have become less numerous had it not been for the erection of mills in the neighbourhood of several of the large seaport towns, which has resulted in the appearance of many grain aliens on the refuse dumped on waste ground and allotments in their vicinity. The fact that botanical observations have extended over an unusually long period accounts for many erroneous records that have caused considerable confusion. While recent discoveries have shown it to be unwise to entirely disregard all old records, since several once considered erroneous have recently been proved correct, a few improbable ones including those of Iola Morganwg, have purposely been omitted.

The list has been compiled from various sources, including:—

The Botanist's Guide through England and Wales, by Turner and L. W. Dillwyn, 1805. (*B.G.*)
Materials for a *Fauna and Flora of Swansea and the neighbourhood*, by L. W. Dillwyn, 1848, unpublished. (L.W.D. Mat.)
Topographical Botany and Supplements, by H. C. Watson, etc. (*J.B. Supp.*)
The Flora of Cardiff, by John Storrie, 1886 (Fl. J.S.), and Notes.
The Flora of Rhondda, by H. Harries, 1905. (*Fl. Rhondda.*)
A *Flora of Glamorgan*, by the Rev. H. J. Riddelsdell, published as a Supplement to the *Journal of Botany*, 1907. (*J.B. Supp.*, 1907.)
Catalogue of Swansea Plants, *Mag. Nat. Hist.*, iii (1839), by T. B. Flower (Flower).
J. W. G. Gutch's "List of Plants near Swansea," in *Phytologist*, Vol. i, (1841 and 1842). (Gutch.)
The Flora of Glamorgan, edited by Dr Trow, 1908, containing notes made by numerous local correspondents. (*Fl. Glam.*)
Notes and Lists published from time to time in *The Phytologist*. (*Phyt.*)
The Proceedings of the Cardiff Naturalists Society. (*C.N.S. Procs.*)
The Proceedings of the Linnean Society of London. (*Proc. Linn. Soc.*)
The Journal of Botany. (*J.B.*)
Tho *Reports of the Botanical Society and Exchange Club of the British Isles.* (*B.E.C.*)

As references are always quoted, the names of the recorders can be ascertained without difficulty in every case. There are also included numerous unpublished records made and collected by the compiler and her father, the late Dr C. J. Vachell, to whose co-operation and early teaching the completion of the list is due.

Plants seen by the compiler are marked ! All critical plants have been examined by experts and those whose names appear in the following pages are most warmly thanked for all the help so kindly given. In cases where the names of critical plants marked ! are not followed by the name of an expert, it may usually be assumed that specimens have been examined at one time or another by Mr A. Bennett, to whom all interesting Glamorgan plants were formerly sent, or by Dr Druce, under whose guidance the compiler has frequently been privileged to visit the many interesting botanical areas in the county and who has often examined the plants in her herbarium, including the sedges.

Warm thanks are also expressed to Mr R. E. Smith, who has spared no pains in helping to determine the status of the aliens, and to the others who have rendered invaluable assistance.

Although many distinguished field botanists have from early times visited the county, leaving behind them diaries and records of considerable interest, comparatively few belonging to a past generation have been resident in the county for any considerable period.

CLEMATIS VITALBA L. Septal, Sylvestral. Locally common!

THALICTRUM FLAVUM L., b. RIPARIUM (Jord.). Paludal. Scarce. Ewenny, etc.!

T. MINUS L., agg., including *montanum* Wallr. and *collinum* Wallr. Littoral, Rupestral. Scarce. Llanmadoc, etc.!, teste Dr Butcher.

(T. DUNENSE Dum. Llanmadoc!, *B.E.C.*, 151, 1905. Porthcawl!, *C.N.S. Procs.*, 1891-2, errors, sps. referred by Dr Butcher to *montanum*).

ANEMONE NEMOROSA L. Sylvestral. Common!

b. PURPUREA DC. Tongwynlais!

*A. RANUNCULOIDES L. Introduced. Penllergaer, Hb. Motley.

*A. APENNINA L. Introduced. Fairy Hill Woods, *B.E.C.*, 102, 1926.

*ADONIS ANNUA L. Casual. Penarth, etc., Fl. J.S., 12, etc.

RANUNCULUS REPENS L. Agrestal, Viatical. Common!

R. ACER L. Pascual. Common!

b. MULTIFIDUS DC. Gower, *J.B. Supp.*, 6, 1907.

c. TOMOPHYLLUS (Jord.). Locally common. *J.B. Supp.*, 6, 1907.

d. RECTUS Bor. Aberdare, etc., *J.B. Supp.*, 6, 1907.

e. STEVENI (Andrz.) Lange. Penard, G. C. Druce.

R. AURICOMUS L. Pascual. Locally common!

R. BULBOSUS L. Pascual. Common!

R. LINGUA L. Paludal. Scarce. Near Cowbridge!

R. FLAMMULA L. Paludal. Common!

b. ANGUSTIFOLIUS Wallr. Local. Kenfig Pool, etc.!, *B.E.C.*, 860, 1925.

R. ARVENSIS L. Agrestal. Dinas Powis!

R. SARDOUS Cr. Inundatal. Scarce. Llandough, etc.!

b. PARVULUS (L.) R. & F. Swansea, B.G., etc.

R. SCELERATUS L. Paludal. Locally common. Cogan, etc.!

R. PARVIFLORUS L. Glareal, Littoral. Locally common near the coast!

R. FLUITANS Lam. Llangenydd, *B.E.C.*, 715, 1922.

R. CIRCINATUS Sibth. Lacustral. Scarce. Kenfig, etc.!

R. TRICHOPHYLLUS Chaix. Lacustral. Locally common! *B.E.C.*, 442, 1921.

R. RADIANS (Revel.). Glamorgan, Pearsall, *B.E.C.*, 448, 1921.

R. DROUETII F. Schultz. Lacustral. Pearsall, *B.E.C.*, 445, 1921.

R. HETEROPHYLLUS Weber. Lacustral. Locally common. Kenfig, etc.!

b. SUBMERSUS Bab. Cadoxton, etc., *J.B. Supp.*, 5, 1907.

R. PELTATUS Schrank. Lacustral. Common! *B.E.C.*, 103, 1926.

b. TRUNCATUS (Koch). Kenfig!, teste W. H. Pearsall.

R. PSEUDO-FLUITANS Baker. Lacustral. Locally common! *B.E.C.*, 332, 1930.

b. MINOR Pearsall. Locally common. River Ely!, teste W. H. Pearsall.

R. Baudotii Godr. Lacustral. Locally common. Llandough, etc.! *B.E.C.*, 103, 1926.

b. marinus (Arr. & Fr.). Cardiff Castle Moat!, also in reens. *B.E.C.*, 332, 1930.

R. lutarius Bouvet. Lacustral. Rhossili Down, *B.E.C.*, 452, 1921.

R. Lenormandi F. Schultz. Lacustral. Locally common!

R. hederaceus L. Lacustral, local. Kenfig, etc.!

b. omiophyllus (Ten.). Llanedarne, *J.B.*, 397, 1909.

R. Ficaria L. Septal. Common!

b. incumbens Schultz. Ely, etc., *J.B.*, 397, 1909.

c. sinuatus Horwood. Near River Taff, Cardiff!, *B.E.C.*, 554, 1924.

Caltha palustris L. Paludal. Common!

b. Guerangerii (Bor.). Scarce. Crumlin Bog, *fide* A. Bennett.

Trollius europaeus L. Pratal, Paludal. Scarce. Dulais River, etc.!

*Helleborus viridis L., b. occidentalis (Reut.) Dr. Sylvestral. Rare. Oxwich Bay, *B.E.C.*, 366, 1918.

H. foetidus L. Sylvestral. Locally common; native in Gower!

*Eranthis hyemalis Salisb. Near Caerau, *J.B.*, 411, 1909.

Aquilegia vulgaris L. Sylvestral, local. Llanishen, etc.!

*Delphinium Ajacis L. Casual. Cardiff, etc.!

*D. consolida L. Casual. Cardiff, Fl. J.S., 14.

Aconitum anglicum Stapf. Sylvestral. Locally common. River Ely, etc.!

Berberis vulgaris L. Septal. Scarce. Merthyr Mawr, etc.!

*Nuphar lutea Sm. Lacustral. Introduced? Penrice, etc.!

Nymphaea alba L. Lacustral, local. Kenfig Pool, etc.!

*Papaver somniferum L. Casual. Scarce. Porthcawl, etc., *J.B. Supp.*, 75, 1907.

b. hispidum H. C. Wats. Llantwit Major, etc., *J.B. Supp.*, 75, 1907.

P. Rhoeas L. Agrestal. Locally common!

b. strigosum (Boenn.). Scarce. Porthcawl, etc., *J.B. Supp.*, 75, 1907.

P. dubium L. Agrestal, local. Near Barry, etc.!

P. Lecoqii Lamotte. Agrestal, etc. Local. Porthcawl, etc., *J.B. Supp.*, 74, 1907.

*P. Argemone L. Agrestal. Near Swansea. Casual. Cardiff, etc.!

*P. hybridum L. Casual. Cardiff, etc.!

Meconopsis cambrica (L.) Vig. Rupestral. Rare. Pontneddfechan, etc.!

Glaucium flavum Crantz. Littoral. Locally common!

*G. corniculatum (L.) Curt. Casual. Splott!, *B.E.C.*, 385, 1927.

*Roemeria hybrida DC. Casual. Splott!, *B.E.C.*, 104, 1926.

*Chelidonium majus L. Septal. Viatical. Locally common!

Corydalis claviculata (L.) DC. Rupestral. Scarce. Caerphilly, etc.!

*C. bulbosa (L.) DC. Naturalised. Near Cottrel, etc.!

*C. lutea DC. Rupestral. Scarce. Southerndown, etc.!

FUMARIA CAPREOLATA L. Agrestal, etc. Oystermouth. Sowerby, *E.B.*, i, 105.

b. BABINGTONII Pugsl. Oxwich!, teste H. W. Pugsley.

F. PURPUREA Pugsl. Agrestal, etc. Rare. Llandaff, etc.!, teste H. W. Pugsley.

F. BORAEI Jord. Agrestal, etc. Scarce. St Nicholas, etc.!, teste H. W. Pugsley.

*b. GRACILIS (Pugsl.). Adventive. Barry Dock, *B.E.C.*, 861, 1925.

F. MURALIS Sond. Agrestal, etc. Near Swansea, *T.B. Supp.*, 9.

F. BASTARDI Boreau. Agrestal, etc. Scarce, Llandaff, etc.!, teste H. W. Pugsley.

F. OFFICINALIS L. Agrestal. Common!

*F. MICRANTHA Lag. Casual. Llandaff, Hb. N.M. of Wales.

*F. PARVIFLORA Lam. Casual. Ballast, Fl. J.S., 15; *T.B. Supp.*, 9.

*MATTHIOLA INCANA Br. Rupestral. Nash cliffs!, *J.B.*, 217, 1905.

M. SINUATA Br. Littoral. Swansea! Extinct ?.

*CHEIRANTHUS CHEIRI L. Rupestral. Locally common!

b. FRUTICULOSUS (L.). Aberdare, *J.B. Supp.*, 76, 1907.

RORIPPA OFFICINALE Br. Paludal. Common!

b. SIIFOLIUM Reichb. Mayals, *B.E.C.*, 367, 1918.

c. MICROPHYLLUM Crantz. Aberdare, *J.B. Supp.*, 8, 1907.

R. SYLVESTRE Br. Paludal. Common!

R. AMPHIBIUM Br. Paludal. Scarce. Near Morriston, *B.E.C.*, 386, etc., 1927.

R. ISLANDICUM (Oeder). Inundatal. Common!

*BARBAREA VERNA Asch. Viatical. Rare. Near Barry, etc.!

B. VULGARIS R. Br. Septal, Viatical. Common!

*B. INTERMEDIA Boreau. Viatical. Rare. St Fagans!, *B.E.C.*, 634, 1931.

ARABIS HIRSUTA Scop. Rupestral. Common!

b. GLABRATA (Syme) Dr. Newton sand dunes!, teste A. Bennett.

*A. CAUCASIA Willd. Adventive. Merthyr Mawr Quarry, *B.E.C.*, 637, 1919.

CARDAMINE PRATENSIS L. Pratal. Common!

b. DENTATA (Schultes). Llanrhidian, *J.B. Supp.*, 9, 1907.

C. AMARA L. Paludal. Very rare. Pontypridd. J.S. ?. *T.B. Supp.*, 12.

C. IMPATIENS L. Rupestral. Very rare. Morlais Castle, *J.B. Supp.*, 9, 1907.

C. FLEXUOSA With. Rupestral, Sylvestral. Common!

C. HIRSUTA L. Rupestral, etc. Common!

*C. TRIFOLIA L. Established. Singleton, *B.E.C.*, 637, 1919.

*ALYSSUM ALYSSOIDES L. Adventive. Penarth, etc., Fl. J.S., 17.

*A. INCANUM L. Adventive. Barry!

*A. MARITIMUM Lam. Casual. Scarce. Porthcawl, etc.!

DRABA AIZOIDES L., var. MONTANA Koch. Rupestral. Rare. Penard Castle and cliffs, Gower!

(D. incana L. and D. muralis L. errors. *Sw. Sc. Soc. Procs.*, 1929.)

Erophila verna (L.) Meyer, b. cabillonensis (Jord.) O. E. Schulz. Barry Island, *B.E.C.*, 186, 1929.

E. Boerhavii (Van Hall) Dum., b. decipiens (Jord.) O. E. Schulz. Kenfig, *B.E.C.*, 193, 1929.

E. praecox (Stevens) DC. Porthkerry, *J.B.*, 398, 1909.
  b. virescens (Jord.) O.E.S. Cold Knap, etc., *J.B.*, 398, 1909.

*Cochlearia Armoracia L. Viatical. Common!

C. officinalis L. Littoral, etc. Scarce!

C. anglica L. Littoral. Locally common. Leckwith, etc.!

C. danica L. Littoral. Locally common. Southerndown, etc.!

*Hesperis matronalis L. Viatical. Scarce. Gower, etc.!

*Sisymbrium Sophia L. Viatical. Scarce. Swanbridge, etc.!

*S. altissimum L. Viatical. Locally common!

*S. orientale L. Viatical. Locally common!
  b. irioides (Thell.). Grangetown, *B.E.C.*, 213, 1920.

*S. Irio L. Casual. Barry, *B.E.C.*, 168, 1923.

S. officinale (L.) Scop. Viatical, Agrestal. Common!
  b. leiocarpum DC. Locally common!

S. Thalianum (L.) Gay. Rupestral, Agrestal. Common!

S. Alliaria Scop. Septal. Common!

*Erysimum cheiranthoides L. Casual. Splott, etc.!

*Conringia orientalis (L.) Dum. Casual. Newton, etc.!

*Camelina sativa Crantz. Casual. Splott, etc.!

*C. Alyssum (Mill.) Thell. Barry Island, *J.B. Supp.*, 75, 1907.

Brassica oleracea L. Rupestral, Littoral, native on lias sea cliffs!

*B. Napus L. Viatical, Agrestal. Common!

*B. Rapa L. Agrestal, Viatical. Common. Cardiff, *J.B.*, 257, etc., 1884.
  b. Briggsii Wats. Cardiff Docks, etc., *J.B. Supp.*, 75, 1907.

B. monensis Huds. Littoral. Very rare. Three Cliffs Bay! Extinct?

*B. Cheiranthos Vill. Viatical, local. Near Grangetown!

B. nigra L. Viatical, etc. Native on sea cliffs!

B. arvensis Kuntz. Agrestal. Common!
  b. orientalis (L.) Aschers. Cardiff Docks, etc., *J.B. Supp.*, 10, 1907.

*B. alba (L.) Boiss. Agrestal, etc. Locally common!

*B. gallica (Willd.) Dr. Casual. Splott!

*B. incana (L.) F. Schultz. Adventive. Established near Docks, etc.!, *B.E.C.*, 168, 1923.

*Diplotaxis tenuifolia (L.) DC. Viatical, local. Grangetown, etc.!

D. muralis (L.) DC. Viatical, Littoral. Locally common!
  b. Babingtonii (Syme). Gower, *J.B. Supp.*, 10, 1907.

*D. erucoides DC. Casual. Barry, *B.E.C.*, 557, 1924.

Bursa pastoris Weber. Viatical, Agrestal. Common!

B. abscissa (E. At.). Cardiff, Hb. N.M. of Wales.

B. anglica (E. At.). Barry, *B.E.C.*, 105, 1926.

B. BATAVORUM (E. At.) Aberdare, *B.E.C.*, 197, 1920.
B. BRITTONII (E. At.). Cardiff, *B.E.C.*, 637, 1931.
B. DRUCEANA (E. At.). Barry, *B.E.C.*, 387, 1927.
B. GALLICA (E. At.). Cardiff, *B.E.C.*, 863, 1925.
B. GERMANICA (E. At.). Cardiff, *B.E.C.*, 863, 1925.
B. LAEVIGATA (E. At.). Barry, *B.E.C.*, 387, 1927.
B. ROBUSTA (E. At.). Grangetown, Hb. N.M. of Wales.
B. SINUOSA (E. At.). Cardiff, Hb. N.M. of Wales.
B. TREVIRORUM (E. At.). Cardiff, Hb. N.M. of Wales.
B. TURONIENSIS (E. At.). Cardiff, Hb. N.M. of Wales.
B. VIMINALIS (E. At.). Taffs Well, etc., Hb. N.M. of Wales.
B. SEGETUM (E. At.). Cardiff, Hb. N.M. of Wales.
CORONOPUS DIDYMUS Sm. Viatical. Locally common! Doubtful native.
C. RUELLII All. Glareal, Viatical. Locally common!
*LEPIDIUM GRAMINIFOLIUM L. Viatical. Cardiff, etc.!, *B.E.C.*. 170, 1923.
*L. LATIFOLIUM L. Littoral, local. Banks of River Taff!, *B.E.C.*, 718, 1922.
*L. DRABA L. Viatical, local. Common!
*L. RUDERALE L. Viatical. Cardiff!
L. CAMPESTRE (L.) Br. in Ait. Agrestal, Viatical. Locally common!
L. SMITHII Hook. Agrestal, Viatical. Locally common. Pwllypant, etc.!
b. CANESCENS Gren. & Godr. Llancaiach, *J.B.*, 398, 1909.
*L. NEGLECTUM Thell. Adventive. Cardiff!, *B.E.C.*, 388, 1927.
*L. SATIVUM L. Casual, Local. Cardiff!
*THLASPI ARVENSE L. Agrestal, Viatical, Local. Cardiff, etc.!
T. ALPESTRE L. Pontneddfechan, etc., *B.G.*
TEESDALIA NUDICAULIS (L.) Br. Swansea, L.W.D. Mat., 42. Extinct?
*IBERIS AMARA L. Adventive. Kenfig, Hb. Motley, etc.
HUTCHINSIA PETRAEA Br. in Ait. Rupestral, Glareal. Locally common. Kenfig, etc.!
*BUNIAS ERUCAGO L. Casual. Cardiff, *J.B. Supp.*, 75, 1907.
*B. ORIENTALIS L. Casual. Penarth, etc., Fl. J.S., 110.
CRAMBE MARITIMA L. Littoral. Rare. The Leys!, etc.
*RAPISTRUM PERENNE L. Casual. Cardiff Docks, *J.B. Supp.*, 76, 1907.
*R. RUGOSUM (L.) All. Casual. Port Talbot Docks, *J.B. Supp.*, 76, 1907.
CAKILE MARITIMA Scop. Littoral. Locally common. Baglan, etc.!
RAPHANUS RAPHANISTRUM L. Agrestal, Viatical. Locally common!
R. MARITIMUS Sm. Littoral. Penclawdd, Hb. Brit. Mus., 1887, etc.
*RESEDA ALBA L. Adventive. Near Docks, etc.!
R. LUTEA L. Agrestal, etc. Locally common!
R. LUTEOLA L. Viatical, etc. Common!
*R. PHYTEUMA L. Casual. Cardiff, *B.E.C.*, 719, 1922.
*R. STRICTA Pers. Casual. Splott, *B.E.C.*, 335, 1930.
HELIANTHEMUM CHAMÆCISTUS Mill. Pascual. Common!
H. CANUM (L.) Baumg. Rupestral, local. Gower!

Viola silvestris Lam. Sylvestral. Common!
  b. punctata Dr. Wenvoe, *B.E.C.*, 232, 1912.

V. Riviniana Reichb. Sylvestral. Common!
  b. vicina (Martr.-Don.). Caerau, etc., *J.B.*, 399, 1909.

V. rupestris Schmidt, var. glabrescens Schmidt. Ewenny Down!. *B.E.C.*, 335, etc., 1930. (Error, P. M. Hall).

V. canina L. Scarce. Ewenny Down!, teste P. M. Hall.
  b. ericetorum Reichb. Littoral. Locally common. Kenfig, etc.!
  c. pusilla Bab. Ewenny Down!, teste P. M. Hall.

V. lactea Sm. Pascual. Rare. Gower, as *stagnina*, *J.B.*, 312, 1904, and *J.B. Supp.*, 13, 1907, etc.

V. odorata L. Septal, Sylvestral. Common!
  b. praecox Greg. Llandaff!, *B.E.C.*, 148b, 1917.
  c. dumetorum (Jord.). Common! *B.E.C.*, 106, 1929.
  d. immaculata Greg. Fairwater!, *B.E.C.*, 107, 1926. (Error, P. M. Hall).
  e. subcarnea (Jord.). Local. St Nicholas!, etc., *B.E.C.*, 106, 1929.

V. hirta L. Sylvestral, etc. Common!
  b. propera (Jord.) Gillot. Cowbridge!, teste Gregory.

V. calcarea Greg. Glareal. Very rare. Ewenny Down!, teste P. M. Hall.

V. palustris L. Uliginal. Common. Caerphilly, etc.!

V. epipsila Ledeb. Uliginal. Very rare. Caerphilly, McLean.

V. variata Jord. Agrestal, etc. Scarce. St Fagans!, etc., teste E. Drabble.

V. Lejeunei Jord. Agrestal. Scarce. Llandaff!, teste E. Drabble.

V. Lloydii Jord. Agrestal. Scarce. Llandaff, *B.E.C.*, 199, 1926.

V. agrestis Jord. Agrestal. Common. St Lythans!, *B.E.C.*, 457, 1930.

V. segetalis Jord. Agrestal, etc. Scarce. Llandaff, etc., *B.E.C.*, 199, 1926.

V. obtusifolia Jord. Agrestal, etc. Scarce. Llandaff!, teste E. Drabble.

V. ruralis Boreau. Agrestal, etc. Scarce. Llwydcoed, *B.E.C.*, 199, 1926.

V. Deseglisei Jord. Agrestal, etc. Scarce. Llwydcoed, etc., *B.E.C.*, 199, 1926.
  b. subtilis (Jord.). Scarce. Penarth Ferry, *B.E.C.*, 215, 1920.

V. arvatica Jord. Agrestal, etc. Scarce. Sker!, teste E. Drabble.

V. lutea Huds. Pascual. Rare. Craig Koynoch, etc., *B.E.C.*, 199, 1926.
  b. amoena Hensl. Near Pontypridd, Hb. N.M. of Wales.

V. Curtisii Forst. Littoral. Locally common!

V. Mackaii H. C. Wats. Littoral. Locally common! Kenfig!, *B.E.C.*, 460, 1930.

Polygala serpyllifolium Hose. Ericetal. Scarce. Mynydd-y-glew, etc.!

P. vulgare L. Glareal, etc. Common!

P. dubium Bellynck. Glareal. Locally common!
    b. dunense Dum. Kenfig!, etc. (*B.E.C.*, 336, 1930).
Dianthus deltoides L. Glareal, etc. Rare. Mayals, *B.E.C.*, 866, 1925.
D. Armeria L. Pascual. Very rare. Merthyr Mawr!, etc., Hb. Vachell.
*D. Caryophyllus L. Rupestral. Cardiff Castle, extinct, Fl. J.S., 21.
*Tunica prolifera (L.) Scop. Casual. Splott, *B.E.C.*, 181, 1926.
Saponaria officinalis L. Viatical, etc. Common!
    b. hirsuta Wierzb. Merthyr Mawr, *J.B.*, 316, 1902.
*S. Vaccaria L. Viatical, local. Cardiff Docks, etc., Fl. J.S., 112.
Silene maritima With. Littoral. Locally common. Gower, etc.!
S. angustifolia S. & T. Agrestal, etc. Locally common. St Nicholas, etc.!
    b. pubescens DC. Common. *B.E.C.*, 643, 1919.
*S. conica L. Casual. Barry, etc., *B.E.C.*, 172, 1923.
*S. noctiflora L. Agrestal. Rare. Gigman!; Casual, Cardiff, etc.!
S. anglica L. Agrestal. Locally common. Southerndown, etc.!
*S. gallica L. Casual. Splott!
*S. Otites (L.). Casual. Ballast, Fl. J.S., 21.
*S. nutans L. Casual. Barry, *B.E.C.*, 1007, 1925.
*S. dichotoma Ehrh. Casual. Splott, etc.!, *B.E.C.*, 172, 1923.
*S. quinquevulnera L. Casual. Pontardulais, Hb. Motley, etc.
Lychnis Flos-cuculi L. Paludal. Common!
L. alba Mill. Agrestal. Scarce. Southerndown, etc.!
L. dioica L. Septal, etc. Common!
*L. Githago (L.) Scop. Agrestal. Rare. Ely!, etc.; Adventive, near Docks!
(Cerastium erectum (L.). East Moors, Fl. J.S., 22).
*C. arvense L. Casual. Barry, etc., *B.E.C.*, 172, 1923.
C. vulgatum L. Agrestal, etc. Common!
    b. alpinum Gren. Aberdare, etc., *J.B. Supp.*, 15, 1907.
    c. pentandrum (Syme). Kenfig, etc., *J.B. Supp.*, 15, 1907.
C. viscosum L. Agrestal, etc. Common!
    b. apetalum (Dum.). Cardiff!
C. pumilum Curt. Glamorgan, E. F. Linton, *T.B. Supp.*, 22, 1905.
C. semidecandrum L. Glareal. Locally common. Kenfig Dunes, etc.!
C. tetrandrum Curt. Littoral. Locally common. Sand dunes, etc.!
Stellaria aquatica Scop. Paludal. Scarce. St Fagans, etc.!
(S. nemorum L. Bodringallt Woods, *Fl. Rhondda*, etc., 14. *T.B.*).
S. media Vill. Agrestal, etc. Common!
    b. apetala (Ucria, 1796). Locally common. Dunes, Candlestone, etc.!
S. neglecta Weihe. var. decipiens (E. S. Marshall). Scarce. Fairwater, *J.B.*, 399, 1909.
S. Holostea L. Septal. Common!
(S. Dilleniana Moench, b. palustris (Retz.) Dr. Records doubtful).
S. graminea L. Pratal, Septal. Common!

S. ALSINE Grimm. Paludal, Uliginal. Common!

ARENARIA TRINERVIA L. Sylvestral. Common!

A. SERPYLLIFOLIA L. Glareal, Agrestal. Common!

b. VISCIDULA Roth. Penard, etc., *J.B. Supp.*, 15, 1907.

c. MACROCARPA Lloyd. Scarce. Kenfig Burrows!

A. LEPTOCLADOS Guss. Glareal. Common!

A. PEPLOIDES L. Littoral. Locally common!

(A. TENUIFOLIA L. Doubtful records.)

SAGINA NODOSA (L.). Inundatal. Scarce. Gower, etc.!

b. GLANDULOSA (Bess.). Margam Moors, *J.B. Supp.*, 16, 1907.

c. MONILIFORMIS Lange. Whiteford Point, *B.E.C.*, 476, 1916.

S. CILIATA Fr. Glareal. Southerndown, *J.B.*, 399, 1909.

b. FILICAULIS (Jord.). Near Cardiff!, *B.E.C.*, 338, 1930.

S. APETALA Ard. Glareal. Common!

b. PROSTRATA S. Gibs. Porthcawl, etc., *J.B. Supp.*, 16, 1907.

S. REUTERI Lange. Glareal. Rare. Penarth, *B.E.C.*, 116, 1920.

S. MARITIMA Don. Littoral. Locally common. Southerndown!

b. DEBILIS (Jord.) Bab. Porthcawl, *J.B. Supp.*, 16, 1907.

c. DENSA (Jord.) Asch. Burry Holm, *J.B. Supp.*, 16, 1907.

S. PROCUMBENS L. Viatical, etc. Common!

SPERGULA ARVENSIS L. Agrestal. Common!

*S. SATIVA Boenn. Casual. Splott, etc.!

SPERGULARIA RUPICOLA Lebel. Littoral, Rupestral. Scarce. Porthcawl, etc.!

S. MEDIA (Pers.) Presl. Littoral. Locally common. Near Cardiff, etc.!

S. SALINA Presl. Littoral. Locally common. Aberthaw, etc.!

*S. BOCCONEI (Soleir.) Steud. Casual. Barry!, *B.E.C.*, 39, 1927.

S. RUBRA (L.) Presl. Glareal, etc. Scarce!

*POLYCARPON TETRAPHYLLUM L. Near Pyle, *B.G.*, native?; adventive, Barry Docks!

*CLAYTONIA SIBIRICA L. Casual. Penarth, Fl. J.S.

*(C. PERFOLIATA Donn. Cardiff, Fl. J.S., 109. Extinct.)

MONTIA FONTANA L. Inundatal. From 250 ft. to 800 ft. in Glam., *J.B.*, 230, 1912.

b. BOREO-RIVULARIS Dr. The Bwllfa, Aberdare, at 700 ft., *J.B.*, 230, 1912.

M. VERNA Neck. Inundatal. Common. Kenfig, etc!, teste A. E. Wade.

*TAMARIX GALLICA L. Established near sea, Porthcawl, *Phyt.*, ii, 972, etc.

ELATINE HEXANDRA DC. Lacustral. Rare. Mynydd-y-glew!, etc., *B.E.C.*, 376, 1921.

*HYPERICUM HIRCINUM L. Penmaen, *Sw. Sc. Soc. Procs*, 62, 1929.

HYPERICUM ANDROSAEMUM L. Sylvestral. Locally common. Castell Coch, etc.!

*H. ELATUM Ait. Sully, Fl. J.S., 111.

*H. CALYCINUM L. Established. Nicholston wood, near Penrice Castle!, L.W.D. Mat., 33.

H. MONTANUM L. Sylvestral. Rare. Llansannor!, etc.

H. HIRSUTUM L. Sylvestral. Scarce. Cogan, etc.!

H. PULCHRUM L. Ericetal. Locally common!

H. ACUTUM Moench. Paludal. Common!

H. QUADRANGULUM L. Septal. Locally common. Llandaff, etc.!

H. PERFORATUM L. Glareal. Common!

b. ANGUSTIFOLIUM Gaud. Draethen, etc., *J.B.*, 399, 1909.

H. HUMIFUSUM L. Pascual. Locally common!

H. ELODES L. Uliginal. Locally common. Pendoylan, etc.!

ALTHEA OFFICINALIS L. Littoral, local. Gower, etc.!

*A. HIRSUTA L. Casual. Cardiff. Fl. J.S., 24.

LAVATERA ARBOREA L. Littoral, local. The Leys, etc.!

*L. SYLVESTRIS Brot. Adventive. Cardiff, *B.E.C.*, 730, 1928.

MALVA MOSCHATA L. Septal. Locally common!

b. HETEROPHYLLA Lej. & Court. Cwm Nash, etc!, *B.E.C.*, 391, 1927.

M. SYLVESTRIS L. Viatical, etc. Common!

b. LASIOCARPA Dr. Barry Docks. *B.E.C.*, 563, 1924.

c. ACUTILOBA Celak. Nash!, *B.E.C.*, 391, 1927.

M. ROTUNDIFOLIA L. Viatical. Locally common!

*M. PUSILLA Sm. Casual. Splott!

*M. NICAEENSIS All. Casual. Splott!, *B.E.C.*, 391, 1927.

*M. PARVIFLORA L. Casual. Splott!

b. MICROCARPA (Desf.) Fiori & Paol. Splott, *B.E.C.*, 391, 1927.

*(TILIA PLATYPHYLLOS Scop. Record probably erroneous).

*T. EUROPAEA L. Often planted!

T. CORDATA Mill. Sylvestral. Gower, Flower & Lees, etc.

RADIOLA LINOIDES Roth. Ericetal. Scarce. Kenfig, etc.!

LINUM ANGUSTIFOLIUM Huds. Glareal, local. Barry!, etc.

L. CATHARTICUM L. Ericetal. Pascual. Common!

*L. USITATISSIMUM L. Casual. Cardiff, etc.!

GERANIUM SANGUINEUM L. Rupestral, etc. Locally common. Gower, etc.!

b. LANCASTRIENSE (Mill.). Inner Worm's Head, *B.E.C.*, 339, 1930.

*G. VERSICOLOR L. Established occasionally!

G. SYLVATICUM L. Llangiwg, *B.E.C.*, 109, 1929.

G. PRATENSE L. Pratal. Scarce. Vale of Neath, etc.!

*G. PHAEUM L. Septal. Established, Glyn Heath, etc.!

G. PYRENAICUM Burm. f. Viatical. Rare. Llandaff!, etc.

G. COLUMBINUM L. Glareal, etc. Locally common!

G. DISSECTUM L. Agrestal. Common!; Glareal, rare, and on limestone!

G. MOLLE L. Agrestal, Glareal. Common!

G. ROTUNDIFOLIUM L. Viatical. Scarce. Newton, etc.!

G. PUSILLUM L. Viatical, etc. Scarce. Langland cliffs, etc.!

G. LUCIDUM L. Rupestral. Locally common!

G. ROBERTIANUM L. Viatical, Rupestral. Common!
 b. CELTICUM (Ost.). Limestone hills, Llyn-llech-Owen, *B.E.C.*, 564, 1924.
 c. ALBUM. Pwllypant!

G. PURPUREUM Vill., b. INTERMEDIUM Wilm. Barry, *B.E.C.*, 277, 1921.

G. NODOSUM L. Established. Baglan, etc.!, *B.E.C.*, 175, etc., 1923.

ERODIUM MARITIMUM L'Hérit. Littoral. Locally common!

E. MOSCHATUM L'Hérit. Littoral. Scarce. Gower, etc.!
 b. MINOR Rouy. Apparently this variety at Port Talbot Docks, *J.B. Supp.*, 19, 1907.

E. CICUTARIUM L'Hérit. Glareal, Agrestal. Common!
 b. GLUTINOSUM (Dum.). Gower, *J.B. Supp.*, 19, 1907.
 c. LEBELII (Jord.). Baglan Dunes, etc.!, teste E. G. Baker.
 d. NEGLECTUM (B. f. & S.). Gower!, teste E. G. Baker.
 *e. PIMPINELLIFOLIUM (Sibth.). Cardiff!, teste E. G. Baker.

OXALIS ACETOSELLA L. Sylvestral. Common!
 b. SUBPURPURASCENS DC. Castell Coch!, etc.

*O. CORNICULATA L. Casual. Scarce. Canton!

*O. STRICTA L. Garden weed. Scarce. Duffryn!, *B.E.C.*, 109, 1929.

*(IMPATIENS NOLI-TANGERE L. Swansea, etc. Records probably erroneous).

*I. BIFLORA Walt. Established. River Ddaw near Llandough!

*I. PARVIFLORA DC. Established. River Lougher, near Pontyffynon, *J.B. Supp.*, 78, 1907.

*I. GLANDULIFERA Royle. Established. River banks. Common!

ILEX AQUIFOLIUM L. Septal, Sylvestral. Common!

EUONYMUS EUROPAEUS L. Septal, Sylvestral. Locally common!

RHAMNUS FRANGULA L. Sylvestral. Locally common!

R. CATHARTICUS L. Septal, Glareal, local. Near Newton, etc.!

*STAPHYLEA PINNATA L. Sylvestral. Established. Penylan, etc.!

*ACER PSEUDO-PLATANUS L. Planted. Common!

A. CAMPESTRE L. Sylvestral. Common!
 b. LEIOCARPON Wallr. Roath, *B.E.C.*, 831, 1922.

*LUPINUS NOOTKATENSIS Donn. Adventive. Blackpill, *B.E.C.*, 564, 1924.

*LABURNUM VULGARE Presl. Established. Limestone cliffs, Langland, *B.E.C.*, 378, 1921.

GENISTA ANGLICA L. Ericetal. Scarce. Penylan, etc.!

G. TINCTORIA L. Pascual, etc. Locally common!

ULEX EUROPAEUS L. Ericetal. Common!

U. GALLII Planch. Ericetal. Common!
 b. HUMILIS Planch. (as *nanus*). Worm's Head, Hb. Motley. Probably this, A. Bennett, *in litt.*

CYTISUS SCOPARIUS (L.) Link. Ericetal. Common!

ONONIS RECLINATA L. Port Eynon, 1828, Hb. Jos. Woods; until 1910, *Sw. Sc. Soc. Procs.*, 1929.

O. REPENS L. Glareal. Common!
 b. HORRIDA Lange. Kenfig, etc.!

O. SPINOSA L. Pascual. Locally common!

TRIGONELLA ORNITHOPODIOIDES DC. Pascual, etc. Scarce. Cogan!

*MEDICAGO FALCATA L., b. TENUIFOLIOLATA Vuyck. Adventive. Scarce, Grangetown, etc.!

c. MINOR Gaud. Barry Dock, B.E.C., 611, 1928.

*M. SYLVESTRIS Fries. Adventive. Penarth Ferry, *B.E.C.*, 110, 1929.

*M. SATIVA L. Adventive. Local!

*M. HISPIDA Gaertn., b. DENTICULATA (Willd.). Casual. Splott, etc.!

M. ARABICA Huds. Viatical. Locally common. Grangetown!, etc.

*M. MINIMA (L.) Desr. Established at Barry, *B.E.C.*, 178, 1923.

M. LUPULINA L. Agrestal, etc. Common!

b. SCABRA S. F. Gray. Canton, *J.B.*, 400, 1909.

c. WILLDENOWIANA Koch. Radyr, *B.E.C.*, 378, 1921.

d. INTEGRISTIPULA (Rouy) Dr. Kenfig Dunes, *B.E.C.*, 611, 1928.

MELILOTUS ALTISSIMA Thuill. Septal, Viatical. Locally common in hedges!

*M. ALBA Desr. Adventive. Splott, etc.!

*M. ARVENSIS Wallr. Adventive. Cardiff, etc.!

*M. INDICA (L.) All. Casual. Splott, etc.!

b. TOMMASINI (Jord.) Rouy. Barry, *B.E.C.*, 732, 1928.

c. EXALTATA Biv. Splott, *B.E.C.*, 303, 1927.

TRIFOLIUM MEDIUM (L.) Huds. Pratal. Locally common!

b. PEDUNCULOSUM Ser. St Donats, *B.E.C.*, 303, 1927.

T. PRATENSE L. Pratal. Common!

*b. SATIVUM Schreb. Ballast. *J.B. Supp*, 21, 1907.

c. PARVIFLORUM Bab. Barry, *B.E.C.*, 392, 1927.

*T. OCHROLEUCON Huds. Casual. Ballast. Fl. J.S., 29.

*T. INCARNATUM L. Agrestal, field borders!. etc. Local.

*T. STELLATUM L. Casual, Fforest Fach, *B.E.C.*, 378, 1921, etc.

T. ARVENSE L. Glareal. Locally common. Kenfig, etc.!

b. BRITTINGERI Weitenw. Cardiff, *B.E.C.*, 303, 1927.

c. PERPUSILLUM Ser. Aberafan, *J.B. Supp.*, 22, 1907.

T. MARITIMUM Huds. Littoral. Rare. Pengam Moors!

T. SCABRUM L. Glareal. Locally common. Southerndown, etc.!

T. STRIATUM L. Glareal. Locally common. Southerndown, etc.!

T. SUBTERRANEUM L. Glareal. Rare. Port Eynon, etc.!

T. FRAGIFERUM L. Pascual. Locally common. Gower, etc.!

*T. HYBRIDUM L. Agrestal, etc. Common!

b. ELEGANS (Savi). Barry, *B.E.C.*, 392, 1927, etc.

T. REPENS L. Pascual. Common!

*T. GLOMERATUM L. Adventive. Radyr, *B.E.C.*, 724, 1922, etc. Blackpill Links, *Sw. Sc. Soc. Procs.*, 1929.

T. SUFFOCATUM L. Glareal. Rhossili, *B.E.C.*, 375, 1918, etc.

*T. AGRARIUM L. Agrestal, etc. Near Caerphilly!, etc.

T. PROCUMBENS L. Pascual. Common!

T. DUBIUM Sibth. Pascual. Common!

T. FILIFORME L. Pascual, local. Cogan, etc.!

*T. resupinatum L. Casual. Splott, etc.! (*B.E.C.*, 179, 1923).
*T. Michelianum Savi. Established. Cardiff!
Anthyllis Vulneraria L. Rupestral, etc. Locally common!
A. rubra Gouan. Littoral. Rare. Porthcawl!
Lotus uliginosus Schkuhr. Paludal. Locally common!
  b. glaber Bréb. Mynydd-y-glew!
L. corniculatus L. Pascual. Common!
  b. crassifolius Pers. Penard, etc., *J.B. Supp.*, 22, 1907.
  c. incanus Gray. Flat Holm!
  d. arvensis (Schkuhr) Ser. Cardiff, *B.E.C.*, 304, 1927.
L. tenuis W. & K. Pascual, local. Cardiff Marshes, *J.B. Supp.*, 22, 1907.
*L. hispidus Desf. Barry, *B.E.C.*, 393, 1927.
(L. angustissimus L. Porthcawl. Record doubtful).
*Dorycnium rectum DC. Adventive. Established. Barry Docks!, *B.E.C.*, 34, 1923.
*Galega officinalis L. Adventive. Cardiff Docks!, etc., *B.E.C.*, 179, 1923.
Astragalus glycyphyllos L. Septal. Very rare. Cold Knap!
*A. boeticus L. Casual. Splott, *B.E.C.*, 257, 1926.
*Coronilla varia L. Viatical. Cadoxton, etc.!
Ornithopus perpusillus L. Glareal. Rare. Caerphilly, etc.!
*O. pinnatus (Mill.) Dr. Casual. Splott, *B.E.C.*, 393, 1927.
Hippocrepis comosa L. Pascual. Rare. Cwm Nash, etc.!
Onobrychis viciaefolia Scop. Agrestal. Locally common!
Vicia sylvatica L. Sylvestral. Scarce. Llandaff, etc.!
V. Cracca L. Septal. Common!
  b. incana Thuill. Near Barry!, etc.
V. Orobus DC. Rupestral, local. Brynamman, *B.E.C.*, 649, 1919, etc.
*V. villosa Roth. Casual. Radyr, etc., *B.E.C.*, 724, 1922.
  b. glabrescens Koch. Barry, etc., *J.B. Supp.*, 79, 1907.
*V. dasycarpa Tenore. Casual. Barry!, etc., *B.E.C.*, 725, 1925, etc.
V. bithynica L. Septal. Near Cardiff, Hook. *Br. Fl.*, Ed. 5. Extinct? Casual. Radyr, *B.E.C.*, 180, 1923.
V. sepium L. Sylvestral. Common!
*V. lutea L. Casual. Fforest Fach, *B.E.C.*, 567, 1924.
*V. hybrida L. Casual. Glam., Hb. Oxon.
*V. sativa L. Agrestal. Common!
V. angustifolia (L.) Reichard. Glareal. Common!
  b. Bobartii (Forst.). Llanishen, *J.B. Supp.*, 23, 1907.
V. Lathyroides L. Glareal. Rare. Near Porthcawl!
*V. narbonensis L., S. & C., b. serratifolia Koch. Casual. Barry, etc., *B.E.C.*, 180, 1923.
V. hirsuta (L.) S. F. Gray. Septal, etc. Locally common!
V. tetrasperma (L.) Moench. Septal. Rare. St Fagans!
*V. gracilis Lois. Casual. Cardiff, etc., Fl. J.S., 30.

*Lathyrus latifolius L. Septal. Established. St Donats, etc!, *B.E.C.*, 393, 1927.
L. sylvestris L. Septal, etc. Local. Swanbridge, etc.!
*L. tuberosus L. Adventive. Established. Barry Docks!
L. maritimus Bigel. Rare. Coast of Glamorgan!, non-flowering.
L. palustris L. Paludal. Very rare. Gower, *J.B.*, 251, 1891.
L. pratensis L. Pratal. Common!
L. Nissolia L. Pascual. Scarce. Rhoose!, etc.
*L. Aphaca L. Casual. Scarce. Llandaff, etc.!
*L. sphaericus Retz. Barry, *B.E.C.*, 1012, 1925.
L. montanus Bernh. Sylvestral. Locally common!
  b. tenuifolius Garcke. Aberdare, *J.B. Supp.*, 23, 1907.
Prunus Padus L. Sylvestral. Rare. Llanbradach, etc.!
P. avium L. Sylvestral. Scarce. Leckwith, etc.!
P. Cerasus L. Sylvestral. Very rare. Llanishen, etc., *B.E.C.*, 263, 1915.
*P. domestica L. Septal. Scarce. Sully!
P. insititia L. Sylvestral. Scarce. Ely, *J.B. Supp.*, 24, 1907.
P. spinosa L. Sylvestral. Common!
  b. macrocarpa Wallr. Widely spread all over the Vale, *Fl. Glam.*, 57.
Spiraea Ulmaria L. Pratal. Common!
  b. denudata Boenn. Peterston, *Fl. Glam.*, 58.
(S. Filipendula L. Records doubtful).

The following list is made according to "The Handbook of British Rubi" by the Rev. W. M. Moyle Rogers:—

Rubus idaeus L. Sylvestral, local. Morlais Castle!, etc.
  b. asperrimus Lees. Rudry, *J.B.*, 91, 1906.
R. fissus Lindl. Radyr, *J.B.*, 400, etc., 1909.
R. suberectus Anders. Rhydydefaid Woods, *B.E.C.*, 650, 1919.
R. Rogersii Linton. Aberdare, etc., *J.B.*, 92, 1906.
R. sulcatus Vest. Aberdare, etc., in plenty, *J.B.*, 92, 1906.
R. plicatus Wh. & N. Rhossili Down, etc., *J.B.*, 92, 1906.
  b. Bertramii G. Braun. Cwmdare, *J.B.*, 92, 1906.
R. nitidus Wh. & N., var. opacus Focke. Mynydd Garngoch, *J.B. Supp.*, 24, 1907.
R. affinis Wh. & N. Peterston Moor, *J.B.*, 92, 1906.
R. cariensis Génév. Blackpill, *B.E.C.*, 650, etc., 1919.
[R. carpinifolius Wh. & N. Glamorgan, Supp. Records Br. Rubi, *J.B.*, 313, 1909].
R. incurvatus Bab. Near Pontardawe, etc., *J.B.*, 92, 1906.
R. Lindleianus Lees. Radyr, etc., *J.B.*, 401, 1909.
R. argenteus Wh. & N. Machen, etc., *J.B.*, 401, 1909.
R. rhamnifolius Wh. & N. Radyr, etc., *J.B.*, 401, 1909.
R. Bakeri (F. A. Lees). Peterston, on the moor, *J.B.*, 93, 1906.

R. nemoralis P. J. Muell. Pontardawe, most probably this. W.M.R. in *J.B.*, 93, 1906.

b. silurum Ley. Aberdare, etc., *J.B.*, 93, 1906.

R. dumnoniensis Bab. Clyne Common, etc., *J.B.*, 93, 1906.

R. pulcherrimus Neum. Clyne Common, etc., *J.B.*, 93, 1906.

R. mercicus Bagnall, b. bracteatus Bagnall. Aberdare, etc., *J.B.*, 93, 1906.

R. villicaulis Koehl. Glais, a small form, *J.B.*, 93, 1906.

R. Selmeri Lindeb. Whitchurch, etc., *J.B.*, 401, 1909.

R. gratus Focke. Ystalyfera, *J.B. Supp.*, 24, 1907.

R. Godroni Lec. & Lam. Langland Bay, etc., *J.B.*, 94, 1906.

b. robustus (P. J. Muell.). Ystradowen, etc., *J.B.*, 94, 1906.

c. foliolatus Rogers & Ley. Hill sides near Neath, etc., *J.B.*, 58, 1906.

R. rusticanus Merc. Common plant of mountain limestone and lias. Llandaff, etc., *J.B.*, 94, 1906.

R. pubescens Weihe. Neath, etc., *J.B.*, 94, 1906.

R. macrophyllus Wh. & N. Radyr, etc., *J.B.*, 401, 1909.

b. Schlechtendalii (Weihe). Pontardawe, etc., *J.B.*, 94, 1906.

c. macrophylloides (Génév.). Aberdare, etc., *J.B.*, 94, 1906.

d. amplificatus (Lees). Pontyclun, *J.B.*, 401, 1909.

R. Salteri Bab. Taffs Well, etc., *J.B.*, 94, 1906.

R. hypoleucus Lefv. & Muell. Very common in Llandaff district, *J.B.*, 401, 1909.

R. hirtifolius Muell. & Wirtg. Welsh St Donats, *J.B.*, 95, 1906.

b. danicus (Focke). Penyrheol, etc., *J.B. Supp.*, 25, 1907.

c. mollissimus Rogers. Lisvane, etc., *J.B.*, 95, 1906.

R. iricus Rogers. Peterston Moor, etc., *J.B.*, 95, 1906.

R. pyramidalis Kalt. Caswell Bay, etc., *J.B.*, 95, 1906.

R. leucostachys Sm. Graig Llanishen, etc., in quantity, *J.B.*, 95, 1906.

b. gymnostachys (Génév.). Aberdare, etc., *J.B.*, 95, 1906.

c. leucanthemus P. J. Muell.? Ystalyfera, *J.B. Supp.*, 25, 1907.

R. lasioclados Focke, b. angustifolius Rogers. Langland Bay, etc., *J.B.*, 95, 1906.

c. longus Rogers & Ley. Neath Valley, etc., *J.B.*, 58, 1907.

R. criniger Linton. Llanishen, *J.B.*, 401, 1909.

R. adenanthus Boul. & Gill. Aberdare, *J.B. Supp.*, 25, 1907.

R. cinerosus Rogers. Near Aberdare, *J.B.*, 95, 1906.

R. mucronatoides Ley, f. Pontyclun, *J.B.*, 401, 1909.

R. Gelertii Frider. Aberdare, etc., *J.B. Supp.*, 25, 1907.

R. anglosaxonicus Gelert., b. vestitiformis Rogers. Ystalyfera, *J.B. Supp.*, 25, 1907.

c. curvidens Ley. Pont Whalby, etc., *J.B. Supp.*, 25, 1907.

d. raduloides Rogers. Glamorgan. Supp. Records Br. Rubi, *J.B.*, 340, 1909.

e. setulosus Rogers. Resolven, etc., *J.B.*, 95, 1906.

R. melanoxylon Muell. & Wirtg. Taffs Well, *J.B.*, 95, 1906.

R. infestus Weihe. Near Neath, *J.B.*, 96, 1906.

R. Borreri Bell-Salt. Peterston Moor, etc., *J.B.*, 96, 1906.

b. dentatifolius Briggs. Neath, etc., *J.B.*, 96, 1906.

R. Drejeri G. Jensen. Taffs Well, etc., *J.B.*, 96, 1906.

b. Leyanus Rogers. Glyn Neath, etc., *J.B.*, 96, 1906.

R. echinatus Lindl., f. Swansea, *J.B.*, 157, etc., 1890.

R. oigocladus Muell. & Lefv. Radyr, *J.B.*, 401, 1909.

b. Newbouldii Rogers. Ystradowen, etc., *J.B.*, 96, 1909.

c. Bloxamianus Colem. Ystradowen, *J.B.*, 96, 1906.

R. podophyllus P. J. Muell. Aberdare, *J.B.*, 96, 1906.

R. melanodermis Focke. Caerphilly, but rare, *J.B.*, 96, etc., 1906.

R. Lejeunei Wh. & N. Duffryn Clydach, *J.B.*, 96, 1906.

R. ericetorum Lefv. Radyr, *J.B.*, 401, 1909.

b. cuneatus Rogers & Ley. Llandaff, etc., *J.B.*, 401, etc., 1909.

R. mutabilis Génév. Aberdare, *J.B.*, 96, 1906.

R. fuscus Wh. & N. Aberdare, *J.B.*, 97, 1906.

b. nutans Rogers. Near Aberdare, etc., *J.B. Supp.*, 25, etc., 1907.

R. pallidus Wh. & N. Aberdare, etc., *J.B.*, 97, 1906.

R. scaber Wh. & N. Llantrisant, etc., *J.B.*, 97, 1906.

R. thyrsiger Bab. Pontyclun, *B.E.C.*, 837, etc., 1922.

R. foliosus Wh. & N. Aberdare, *J.B.*, 97, 1906.

R. rosaceus Wh. & N. Caerphilly, *J.B.*, 402, etc., 1909.

b. hystrix Wh. & N. Rudry, etc., *J.B.*, 97, 1906.

c. infecundus Rogers. Baglan, etc., *J.B.*, 97, 1906.

R. horridicaulis (P. J. Muell.). Caerphilly, etc., *J.B.*, 60, 1906.

R. Koehleri Wh. & N. Radyr, *J.B.*, 402, etc., 1909.

b. cognatus (N. E. Brown). Aberdare, etc., *J.B.*, 97, 1906.

R. dasyphyllus Rogers. Glyn Neath, etc., *J.B.*, 97, 1906.

R. Marshalli Focke & Rogers. Aberdare, *J.B.*, 97, etc., 1906.

b. semiglaber Rogers. Aberdare, etc., 97, etc., 1906.

R. serpens Weihe. Glyn Neath, *J.B. Supp.*, 26, 1907.

R. hirtus Waldst. & Kit. Lisvane (apparently form of this), *J.B.*, 97, 1906.

b. rotundifolius Bab. Neddfechan Glen, *J.B.*, 98, 1906.

c. Kaltenbachii (Metsch.). Resolven, *J.B.*, 98, 1906.

R. acutifrons Ley. Glyn Neath, *J.B.*, 98, 1906.

R. tereticaulis (P. J. Muell.). Near Aberdare, *J.B. Supp.*, 26, 1907.

[R. velatus Lefv. Glamorgan, Supp. Records of Br. Rubi, *J.B.*, 345, 1909.]

R. dumetorum Wh. & N. Neath, etc., *J.B.*, 98, 1906.

b. ferox Weihe. Llantrisant Station, etc., *J.B.*, 98, 1906.

c. britannicus (Rogers). Pontneddfechan, *J.B.*, 402, 1909.

d. diversifolius (Lindl.). Draethen, etc., *J.B.*, 98, 1906.

e. raduliformis Ley. In quantity, Coed Caesau Whips, *J.B. Supp.*, 98, etc., 1906.

R. corylifolius Sm. Gowerton, etc., *J.B. Supp.*, 26, etc., 1907.
b. sublustris (Lees). Llanishen, etc., *J.B.*, 98, 1906.
c. cyclophyllus Lindeb. Bonvilstone, *J.B.*, 402, 1909.
R. Balfourianus Blox. Draethen, etc., *J.B.*, 98, 1906.
R. caesius L. Sylvestral, etc. Common!
R. saxatilis L. Rupestral. Rare. Morlais Castle, etc.!
Two additional records to above:—
R. perarmatus W. Watson as Salteri Bab. Caerphilly, *B.E.C.*, 260, 1930.
R. vulnerificus Lefv. as robustus P. J. Muell. Aberdare, *B.E.C.*, 261, 1930.
Geum urbanum L. Viatical, etc. Common!
G. rivale L. Sylvestral, local. Morlais Castle, etc.!
*Fragaria moschata Duchesne. Established. Near Bridgend, *B.E.C.*, 651, 1919.
F. vesca L. Sylvestral. Common!
b. albescens Dr. Near Bridgend, *B.E.C.*, 114, 1929.
*F. chiloensis Duchesne. Established. Railway banks, Radyr, etc.!
(Potentilla fruticosa L. Castell Coch Woods, Fl. J.S., 33. Error).
P. Anserina L. Viatical. Common!
*P. argentea L. Viatical. Rare. Cadoxton!, etc.
P. verna L. Rupestral. Glareal. Rare. Gower!
P. reptans L. Viatical. Common!
P. procumbens Sibth. Septal, etc. Locally common!
P. erecta (L.) Hampe. Ericetal. Common!
P. sterilis (L.) Garcke. Sylvestral, etc. Common!
*P. norvegica L. Viatical. Scarce. Near Cardiff, etc.!
*P. intermedia L. Adventive. Canton, *B.E.C.*, 569, 1924.
P. palustris (L.) Scop. Uliginal. Scarce. Mynydd-y-glew, etc.!
Alchemilla pratensis Schmidt. Pratal. Scarce. Morlais Castle!
A. minor Huds. Pratal. Common!
A. alpestris Schmidt. Rupestral. Scarce. Morlais Castle!
A. arvensis (L.) Scop. Agrestal. Common!
Agrimonia Eupatoria L. Pascual. Common!
A. odorata (Gouan) Mill. Septal, etc. Kenfig!
Poterium Sanguisorba L. Glareal. Common!
*P. polygamum W. & K. Agrestal, etc. Aberthaw, etc., *Fl. Glam.*, 61.
P. officinale (L.) A. Gray. Pratal. Scarce. Near Neath, etc.!

The following list of Roses is according to " A Revision of the British Roses " by Col. Wolley-Dod, who has seen specimens from v.-c. 41 of all the species and varieties named with the exception of those marked with a †.

Rosa arvensis Huds. Septal. Common!
Var. vulgaris Ser. Common. Near Nash, etc.!
f. major Coste. Pengwern Common, etc., *J.B. Supp.*, 28, 1907.
†Var. ovata (Lej.) Desv. Llanbliddian, *J.B. Supp.*, 28, 1907.
Var. biserrata Crép.

Var. LAEVIPES Gren.

R. STYLOSA Desv., var. SYSTYLA (Bast.) Baker. Septal. Locally common. Leckwith, etc.!
f. LANCEOLATA Lindl.

R. SPINOSISSIMA L., var. TYPICA W.-Dod. Littoral. Common!
f. PIMPINELLIFOLIA W.-Dod.

R. CANINA L., agg. Septal. Common!
Var. LUTETIANA (Lem.) Baker. Swanbridge, etc.!
Var. SPHAERICA (Gren.) Dum. Cwrt-yr-ala, Swanbridge!
Var. SPURIA (Pug.) W.-Dod. ? Sully!
Var. GLOBULARIS (Franch.) Dum.
Var. RAMOSISSIMA Rau. Cwrt-yr-ala!
Var. DUMALIS (Bechst.) Dum. Dinas Powis!
f. CLADOLEIA (Rip.).
Var. MEDIOXIMA (Déségl.) Rouy. Swanbridge!
Var. BISERRATA (Mér.) Baker.
f. ERIOSTYLA (Rip.) W.-Dod. ? Dinas Powis!
Var. ANDEGAVENSIS (Bast.) Desp.
f. AGRARIA (Rip.) W.-Dod. Leckwith!
f. SURCULOSA (Woods) Hook. Penclawdd, *J.B. Supp.*, 28, 1907.

R. DUMETORUM Thuill., agg. Septal. Common!
f. URBICA (Lem.) W.-Dod. Glyn Neath, etc., *J.B.*, 403, 1909.
f. SEMIGLABRA (Rip.) W.-Dod. Swanbridge!
(Var. PLATYPHYLLA (Rau) W.-Dod).
Var. SPHAEROCARPA (Pug.) W.-Dod.
Var. HEMITRICHA (Rip.) W.-Dod.
Var. INCERTA (Déségl.) W.-Dod. Dinas Powis!

R. AFZELIANA Fr., agg. Septal. Rare. Oxwich, etc., *J.B.*, 403, 1909.
Var. REUTERI (God.) Cott.
Var. GLAUCOPHYLLA (Winch) W.-Dod. Oxwich, etc., *J.B. Supp.*, 28, 1907.

R. OBTUSIFOLIA Desv., agg. Septal. Rare. Glyn Neath, etc., *J.B. Supp.*, 28, 1907.
Var. TOMENTELLA (Lem.) Baker.

R. VILLOSA L., agg. Septal. Rare.
Var. MOLLIS Sm.
f. CAERULEA Woods.

R. SHERARDI Davies, agg. Septal. Locally common!
Var. TYPICA W.-Dod. Swanbridge, Merthyr, etc.!
f. SUBMOLLIS (Ley) W.-Dod. Hirwaun, etc., *J.B. Supp.*, 402. 1907.
Var. OMISSA Déségl., f. RESINOSOIDES (Crép.), comb. nov.
Var. SUBERECTA (Ley), comb. nov.

R. TOMENTOSA Sm., agg. Septal. Locally common. Llannadoc, etc. *J.B. Supp.*, 27, 1907.
Var. PSEUDO-CUSPIDATA (Crép.) Rouy. Apparently this between Taffs Well and Caerphilly, *J.B.*, 402, 1909.

Var. SCABRIUSCULA Sm. Aberdare, *J.B. Supp.*, 27, 1907.
f. FOETIDA (Bast.) Ser.
R. RUBIGINOSA L., var. TYPICA W.-Dod. Septal. Very rare. Margam Woods, *J.B.*, 402, 1909.
R. MICRANTHA Sm., var. TYPICA Chr. Pascual. Rare. Flat Holm!
†(R. SEPIUM Thuill. No recent records).
PYRUS MALUS L. Septal, Sylvestral. Common!
*b. PARADISIACA L. Common. Dinas Powis!
*P. COMMUNIS L. Septal. Scarce. Llanishen, etc.!
b. ACHRAS (Gaertn.). Singleton Burrows!, *B.E.C.*, 379, etc., 1918.
P. AUCUPARIA (L.) Ehrh. Rupestral, Sylvestral. Common!
P. PORRIGENS (Hedl.). Rupestral. Rare. Castell Coch!, teste A. J. Wilmott.
P. RUPICOLA (Hedl.). Rupestral. Rare. Craig-y-llyn, etc., *Fl. Glam.*, 63.
P. ARIA (L.) Ehrh. Rupestral. Very rare. Nicholston Wood!
P. TORMINALIS (L.) Ehrh. Sylvestral. Very rare. Near Penrice!
*P. GERMANICA Hook. "Planted"?, Fl. J.S., 34.
CRATAEGUS MONOGYNA Jacq. Septal. Common!
b. FISSA Poiret. Blackpill, *B.E.C.*, 379, 1918.
c. CUNEATA Dr. Rhigos, *B.E.C.*, 92, 1911.
d. QUERCIFOLIA (Loud.). Cwm Nash, *B.E.C.*, 455, 1927.
C. OXYACANTHOIDES Thuill. Pyle, etc., *B.E.C.*, 653, 1919.
*C. CRUS-GALLI L. Established. Taibach, etc., *B.E.C.*, 379, 1918.
*COTONEASTER MICROPHYLLUS Wallich. Established. Locally common. Gower, etc.!
*C. SIMONSII Baker. Established. Scarce. Blackpill, *B.E.C.*, 379, 1918.
(SAXIFRAGA AIZOIDES L. Maesteg, Hb. Motley, probable introduction. Extinct?).
S. HYPNOIDES L. Rupestral. Scarce. Morlais Castle!, etc.
S. GRANULATA L. Pascual. Rare. River banks near Cardiff, etc.!
S. TRIDACTYLITES L. Rupestral. Common!
*S. UMBROSA L. Established. Hengoed, *C.N.S. Procs.*, 1891-2, etc.
CHRYSOSPLENIUM ALTERNIFOLIUM L. Uliginal. Rare. Draethen, etc.!
C. OPPOSITIFOLIUM L. Uliginal. Common!
PARNASSIA PALUSTRIS L. Paludal. Rhondda Valley, *Fl. Rhondda.*
*RIBES UVA-CRISPA L., b. GROSSULARIA (L.). Septal. Common!
*R. NIGRUM L. Paludal. Scarce. Banks of River Taff, etc.!
R. RUBRUM L. Sylvestral. Scarce. Banks of River Taff, etc.!, woods, appearing native.
(R. ALPINUM L. Records doubtful.).
*R. SANGUINEUM Pursh. Penrice, *B.E.C.*, 654, 1919.
COTYLEDON UMBILICUS-VENERIS L. Rupestral. Common!
SEDUM PURPUREUM Link. Septal, Rupestral. Scarce. Ilston, etc.!
*S. REFLEXUM L. Rupestral. Scarce. Sant-y-nil, etc.!
b. ALBESCENS (How.). Ystalyfera, *J.B. Supp.*, 80, 1907.
*S. RUPESTRE L. Rupestral. St Mary Church, *C.N.S. Procs.*, 1882.

S. Forsterianum Sm. Rupestral. Very rare. Craig-y-llyn, *Fl. Glam.*, 66.

*S. sexangulare L. Rupestral. Rare. Ilston!, etc.

S. acre L., b. Drucei (Graebn.). Rupestral, Glareal. Common. *B.E.C.*, 162, 1912.

*S. album L. Rupestral. Gower, etc.!

*S. micranthum Bast. Limestone rocks, Cwm Alum, *Fl. Glam.*, 66.

*S. dasyphyllum L. Adventive. Gower, *J.B. Supp.*, 80, 1907.

S. anglicum Huds. Rupestral. Scarce. Brombil, M. Thomas, etc.

(S. villosum L. Doubtful record.).

S. roseum (L.). Rupestral. Rare. Craig-y-llyn, *B.E.C.*, 874, 1925.

*Sempervivum tectorum L. Rupestral. Scarce. Cowbridge, etc.!

Drosera anglica Huds. Uliginal. Crumlin Bog!, *B.G.* Extinct?

D. longifolia L. Uliginal. Local. Mynydd-y-glew, etc.!

D. rotundifolia L. Uliginal. Locally common. Mynydd-y-glew, etc.!

Hippuris vulgaris L. Lacustral. Local. Ogmore, etc.!

Myriophyllum spicatum L. Lacustral. Locally common. Oxwich, etc.!

M. alterniflorum DC. Lacustral. Locally common. Kenfig, etc.!

(M. verticillatum L. Crumlin Bog, *Sw. Sc. Soc. Procs.*, 1891-2.).

Callitriche stagnalis Scop. Lacustral. Common!

b. serpyllifolia (Kuetz.) Lönnr. Oxwich, etc., *J.B. Supp.*, 30, 1907.

C. obtusangula Le Gall. Lacustral. Local. Cwrt-yr-ala, etc.!

C. palustris L. Fairwater, *J.B.*, 113, 1920.

C. intermedia G. F. Hoffm. Lacustral. Common!

b. pedunculata (DC.) Dr. Leckwith Common!

(C. autumnalis L. Several records all doubtless referring to *intermedia*. See *B.E.C.*, 124, 1920.).

Peplis Portula L. Uliginal. Locally common. Mynydd-y-glew, etc.!

Lythrum Salicaria L. Paludal. Common!

*L. Hyssopifolia L. Casual. Ballast. Fl., J.S., 36.

Epilobium angustifolium L. Sylvestral, etc. Common!

E. hirsutum L. Paludal. Common!

E. parviflorum Schreb. Paludal. Common!

E. tetragonum L. Paludal. Locally common. Nr. Cardiff, etc.!, teste G. M. Ash.

E. obscurum Schreber. Septal, etc. Scarce. Caerphilly, teste G. M. Ash.

E. roseum Schreber. Viatical, &c. Locally common. Cardiff, etc.!

E. lanceolatum Seb. & Maur. Viatical. Local. Cogan, etc.!

E. montanum L. Sylvestral, Viatical, etc. Common.

E. palustre L. Paludal. Scarce. Sant-y-nil, etc.!

*Oenothera biennis L. Viatical. Common!

b. parviflora (L.) Dr. Aberdare!, *B.E.C.*, 655, etc., 1919.

*O. odorata Jacq. Established. Glyn Neath, *B.E.C.*, 572, etc., 1924.

Circaea lutetiana L. Sylvestral, etc. Common!

Bryonia dioica Jacq. Septal. Rare. Llandaff!

*Carpobrotus edulis (L.) Barry, *B.E.C.*, 1013, 1925.

Hydrocotyle vulgaris L. Uliginal. Common!

*Eryngium campestre L. Adventive. Established. Barry Docks!, *B.E.C.*, 354, 1930.

E. maritimum L. Littoral. Locally common. The Leys!

Sanicula europaea L. Sylvestral. Common!

Conium maculatum L. Septal, etc. Common!

*Smyrnium Olusatrum L. Viatical. Locally common. Llandough, etc.!

*Bupleurum rotundifolium L. Casual. Aberdare, etc., *J.B. Supp*, 80, 1907.

B. tenuissimum L. Paludal. Rare. Aberthaw, etc.!, *Fl. Glam.*, 72.

Apium graveolens L. Littoral, local. Aberthaw, etc.!

A. nodiflorum (L.) H. G. Reichb. Paludal. Common!

b. pseudorepens (H. C. Wats.) Dr. Clyne Common, *J.B.*, 188, 1906.

A. inundatum (L.) H. G. Reichb. Lacustral, local. Kenfig, etc.!

(Cicuta virosa L. *Sw. Sc. Soc. Procs.*, 1891-2).

*Ammi majus L. Viatical. Cardiff, etc.

*Carum Carvi L. Adventive. Porthcawl, Lloyd, etc.

C. verticillatum Koch. Pratal. Rare. Hirwaun, etc.!

*C. Petroselinum (L.) B. & H. Viatical. Rare. Swanbridge, etc.!, *Fl. Glam.*, 73.

C. segetum B. & H. Septal. Rare. Dinas Powis, etc.!

Sison Amomum L. Septal. Locally common. Cogan, etc.!

*Falcaria vulgaris Bernh. Adventive. Barry Docks!, etc., *B.E.C.*, 354, 1930.

(Sium latifolium L. Swansea, L.W.D. Mat., 41, etc. Doubtful records).

S. erectum Huds. Paludal. Locally common!

*Aegopodium Podagraria L. Viatical. Common!

(Pimpinella major Huds. Record doubtful).

P. saxifraga L. Pascual. Common!

Conopodium majus (Gouan) Loret & Barr. Sylvestral, Pratal. Common!

*Myrrhis Odorata (L.) Scop. Viatical. Very rare. Near Cardiff!, etc.

Chaerophyllum temulentum L. Septal. Common!

Scandix Pecten-veneris L. Agrestal. Locally common. Dinas Powis, etc.!

Chaerefolium sylvestre (L.) Schinz & Thell. Septal. Common!

C. Anthriscus (L.) Schinz & Thell. Viatical. Scarce. Gower, etc.!

Foeniculum vulgare Mill. Rupestral, etc. Locally common. Sully, etc.!

Crithmum maritimum L. Littoral. Locally common. Barry Island, etc.!

Oenanthe crocata L. Paludal. Common!

(O. pimpinelloides L. Error ?).

O. Lachenalii C. Gmel. Paludal. Locally common. Near coast!

O. fistulosa L. Paludal. Locally common. Kenfig, etc.!

Aethusa Cynapium L. Agrestal. Common!

Silaum Silaus (L.) Schinz & Thell. Pratal. Locally common. Near Penarth, etc.!

Angelica sylvestris L. Paludal, etc. Common!

Peucedanum sativum (L.) B. & H. Viatical, etc. Locally common!

*Heracleum Mantegazzianum S. & L. Adventive. Skewen, *B.E.C.*, 186, 1923.

H. Sphondylium L. Septal. Common!
  b. angustifolium Huds. Cardiff, etc.!

*Coriandrum sativum L. Casual. Waste ground!

Daucus Carota L. Pascual. Common!

D. gummifer All. Littoral. Rare. Nash Point, *J.B.*, 404, 1909.

*Caucalis daucoides L. Casual. Barry Docks, etc.!

C. Anthriscus Huds. Septal. Common!

C. arvensis Huds. Agrestal. Rare. Aberdare, *J.B. Supp.*, 33, 1907.

C. nodosa Scop. Glareal. Locally common. Gower, etc.!

*C. latifolia L. Casual. Barry Docks!

Hedera Helix L. Sylvestral. Common!
  b. sarniensis Dr. Cwm Nash!, *B.E.C.*, 398, 1927.

Cornus sanguinea L. Septal. Common.

Adoxa Moschatellina L. Sylvestral. Locally common. Draethen, etc.!

Sambucus nigra L. Sylvestral. Common!
  b. ovali-fructu Dr. Garth Wood, *B.E.C.*, 23, 1929.

*S. Ebulus L. Viatical, local. Cogan, etc.!

Viburnum Opulus L. Sylvestral. Common!

V. Lantana L. Septal. Locally common. Leckwith, etc.!

*Lonicera Caprifolium L. Newton, Lloyd.

L. Peri-Clymenum L. Sylvestral. Common!

*L. Xylosteum L. Established. Loughor, *B.E.C.*, 657, 1919.

*Leycesteria formosa Wallich. Adventive. Resolven, *B.E.C.*, 187, 1923.

*Symphoricarpos racemosus Michx. Ystradowen, etc., *J.B. Supp.*, 81, 1907.

Rubia peregrina L. Sylvestral. Common on bushy sea cliffs!

Galium boreale L. Rupestral. Craig-y-llyn, *J.B. Supp.*, 34, 1907.

G. Mollugo L. Septal. Common!

G. erectum Huds. Viatical. Rare. Llanishen!

G. hercynicum Weig. Ericetal. Common. Southerndown, etc.!

G. pumilum Murray. Rupestral. Rare. Limestone, Morlais Castle!

G. uliginosum L. Locally common. Ystradowen!

G. palustre L. Paludal. Common. Mynydd-y-glew, etc.!
  b. elongatum (Presl). Near Ely, *J.B.*, 404, 1909.
  c. Witheringii (Sm.). Swansea, Flower & Lees, *Phyt.*, 1843.

G. verum L. Pascual. Common!
  b. maritimum DC. Kenfig Burrows!

G. tricorne Stokes. Agrestal. Rare. Gileston!

G. APARINE L. Septal. Common.

*G. SPURIUM L., b. VAILANTII DC. Casual. Splott!

G. CRUCIATA Scop. Septal. Common!

ASPERULA ODORATA L. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

A. CYNANCHICA L. Glareal. Locally common, especially near coast!

*A. ARVENSIS L. Port Talbot Dock, *J.B. Supp.*, 81, 1907.

SHERARDIA ARVENSIS L. Glareal, Agrestal. Common!

VALERIANA OFFICINALIS L. Sylvestral. Glyn Neath, *J.B. Supp.*, 35, 1907.

V. SAMBUCIFOLIA Mikan. Paludal. Common!, *Phyt.*, 379, 1843.

V. DIOICA L. Paludal. Common!

*KENTRANTHUS RUBER (L.). Rupestral. Established. Locally common!

VALERIANELLA OLITORIA Poll. Glareal, Agrestal. Locally common. Sutton, etc.!

*V. ERIOCARPA Desv. Splott, *B.E.C.*, 118, 1929.

V. DENTATA (L.) Poll. Agrestal. Rare. Kenfig, Hb. Motley, etc.
b. MIXTA (L.). Cornfield at Nash!

V. CARINATA Loisel. Rupestral, Agrestal. Local. Ely, etc.!

V. RIMOSA Bast. Agrestal. Porthkerry!, etc.

DIPSACUS SYLVESTRIS Huds. Septal. Common!

D. PILOSUS L. Sylvestral. Rare. Near Llandough Castle!

SCABIOSA COLUMBARIA L. Pascual. Scarce. Gower!, etc.

S. SUCCISA L. Pascual. Common!

S. ARVENSIS L. Agrestal, etc. Common!

EUPATORIUM CANNABINUM L. Paludal, etc. Common!

SOLIDAGO VIRGAUREA L. Ericetal, etc. Common!
b. CAMBRICA Huds. Neath Valley, Gutch, *Phyt.*, 120, 1842.

*S. LANCEOLATA L. Adventive. Cardiff, *B.E.C.*, 1014, 1925.

BELLIS PERENNIS L. Pascual. Common!

*ASTER SALIGNUS Willd. Established. Near Aberdare, etc., *J.B. Supp.*, 81, 1907.

*A. PANICULATUS Lam. Established. Merthyr Mawr. *J.B. Supp.*, 81, 1907.

*A. NOVI-BELGII L., b. FLORIBUNDUS. Established occasionally. *B.E.C.*, 715, 1931.

A. TRIPOLIUM L. Littoral. Locally common. Salt marshes, etc.!
b. DISCOIDEUS Reichb. Near Cardiff, etc.!

(A. LINOSYRIS (L.). Records doubtful).

ERIGERON ACER L. Glareal. Rare. Kenfig Dunes, etc.!

*E. CANADENSIS L. Viatical. Glareal. Scarce. Kenfig Dunes, etc.!

FILAGO GERMANICA (L.) Huds. Glareal. Locally common. Kenfig Dunes, etc.!

F. MINIMA Pers. Glareal. Rare. Kenfig Dunes, etc.!

ANTENNARIA DIOICA (L.) Gaertn. Ericetal. Rare. Mumbles Head!, etc.

*ANAPHALIS MARGARITACEA C. B. Clarke. b. SUBALPINA A. Gray. Viatical. Locally common!

*GNAPHALIUM LUTEO-ALBUM L. Casual. Barry Docks!. *B.E.C.*, 399, 1927.

G. ULIGINOSUM L. Inundatal. Common!

G. SYLVATICUM L. Ericetal. Very rare. Sker!

*INULA HELENIUM L. Septal, etc. Scarce. Llandough, etc.!

I. SQUARROSA (L.) S. & T. Septal, Glareal, etc. Locally common!

I. CRITHMOIDES L. Littoral, local. Gower, etc.!

*I. VISCOSA Ait. Adventive. Established. Barry Docks, etc.!, *B.E.C.*, 188, 1923.

PULICARIA DYSENTERICA Bernh. Pascual, Paludal. Common!

*P. VULGARIS Gaertn. Adventive. Penarth, *B.E.C.*, 188, 1923.

*AMBROSIA ARTEMISIFOLIA L. Adventive. Barry, etc.!, *B.E.C.*, 189, 1923.

*XANTHIUM STRUMARIUM L. Casual. Waste ground!

*X. SPINOSUM L. Casual. Waste ground!

*GUIZOTIA ABYSSINICA Cass. Casual. Llandaff, etc.!, *B.E.C.*, 730, 1922.

BIDENS CERNUA L. Paludal. Scarce. Gower, etc.!

B. TRIPARTITA L. Paludal, Viatical. Locally common. Cardiff, etc.!

*GALINSOGA PARVIFLORA Cav. Casual. Waste ground!

*ANACYCLUS CLAVATUS Pers. Casual. Splott, etc.!

*A. RADIATUS Lois. Casual. Splott, etc.!

ACHILLEA MILLEFOLIUM L. Pascual. Common!

A. PTARMICA L. Pratal. Locally common. Penylan, etc.!

(DIOTIS MARITIMA Cass. Crumlin Burrows, *Sw. Sc. Soc. Procs.*, 1921 error?).

*ANTHEMIS TINCTORIA L. Adventive. Rare. Cadoxton, etc.!

b. DISCOIDEA (Willd.). Cadoxton!

A. NOBILIS L. Pascual. Locally common. Aberthin Green, etc.!

*A. ARVENSIS L. Viatical? Scarce. Barry Island, etc.!

A. COTULA L. Agrestal. Locally common. Sully, etc.!

CHRYSANTHEMUM SEGETUM L. Agrestal, etc. Locally common!

C. LEUCANTHEMUM L. Pascual. Common!

*C. PARTHENIUM (L.) Bernh. Viatical. Scarce. Nr. Merthyr!, etc.

MATRICARIA INODORA L. Agrestal, etc. Common!

b. SALINA Bab. The Leys, etc., *J.B. Supp.*, 37, 1907.

M. CHAMOMILLA L. Agrestal, etc. Locally common. Sully, etc.!

*M. SUAVEOLENS (Pursh) Buch. Viatical. Common!

TANACETUM VULGARE L. Viatical. Common!

ARTEMISIA ABSINTHIUM L. Viatical. Local. Monknash, etc.!

*A. CAMPESTRIS L. Casual. Cardiff Docks, Fl. J.S., 54.

A. VULGARIS L. Viatical, etc. Common!

b. COARCTATA Fors. Llandaff, etc., *J.B.*, 404, 1909.

A. MARITIMA L. Littoral. Locally common. Aberthaw, etc.!

b. GALLICA (Willd.). Aberthaw!

*A. BIENNIS Willd. Adventive. Radyr, *J.B.*, 491, etc., 1916.

*A. LUDOVICIANA Nutt., b. GNAPHALODES (Nutt.). Adventive. Established. Radyr, etc., *B.E.C.*, 1016, 1925.

TUSSILAGO FARFARA L. Agrestal, etc. Common!

PETASITES OVATUS Hill. Pratal, Paludal. Locally common by rivers, etc.!

*P. fragrans Presl. Viatical. Locally common. Llandough, &c.!

*Doronicum Pardalianches L. Established. Bridgend, Fl. J.S., 53.

*D. plantagineum L. Established in a few places!

Senecio aquaticus Hill. Inundatal. Common!

S. erraticus Bert. Near Swansea, 1836, T. B. Flower.

S. Jacobaea L. Glareal, Pascual, etc. Common!

b. discoideus L. Splott!

S. erucifolius L. Septal, Pascual, etc. Locally common. Cogan, etc.!

*S. squalidus L. Viatical. Locally common!

S. sylvaticus L. Glareal. Scarce. Rhiwbina!, etc.

S. viscosus L. Viatical. Kenfig, etc.!

S. vulgaris L. Agrestal. Common.

b. praecox (Trow). Locally common. Penarth, etc., *Fl. Glam.*, 91.

c. erectus (Trow). Common. *Fl. Glam.*, 91.

d. multicaulis (Trow). Rare. Swanbridge, etc.!, *Fl. Glam.*, 91.

*S. Cineraria DC. Established. Horton cliff, *B.E.C.*, 731, 1922.

(S. palustris Hook. Aberafan. Ray, *Third Itinerary*. Error ?).

*Calendula arvensis L. Casual. Splott!

Carlina vulgaris L. Glareal. Locally common!

Arctium Lappa L. Sylvestral, Viatical. Scarce. Monknash Cwm, etc.!

A. nemorosum Lej. Viatical. Rare. Cardiff!, teste A. H. Evans.

A. minus (Hill) Bernh. Sylvestral, etc. Common!, teste A. H. Evans.

Carduus nutans L. Glareal. Common!

C. acanthoides L. Septal, etc. Locally common. Near Cogan, etc.!

b. crispus. Parkmill, etc., *J.B. Supp.*, 38, 1907.

C. pycnocephalus L., b. tenuiflorus (Curt.). Viatical. Common near coast!

Cirsium eriophorum (L.) Scop., b. britannicum (Petrak). Pascual, local. Chiefly on lias. Nash, etc.!

C. lanceolatum Scop. Pascual. Common!

(C. heterophyllum (L.) Hill. Between Llandaff and Cowbridge, *B.G.*, ? error).

C. acaule (L.) Weber. Glareal. Locally common. Cefn On, etc!

b. caulescens (Pers.). Local. Heol-y-mynydd!

C. pratense (Huds.) DC. Uliginal. Common!

C. tuberosum (L.) Alf. (as *Woodwardi*, *T.B.*). Pascual. Rare. About Nash Point!, *Phyt.*, i; *J.B.*, 1906.

C. arvense (L.) Scop. Agrestal. Common!

b. mite Koch. Locally common!

c. setosum C. A. Mey. Crumlin, *B.E.C.*, 663, etc., 1919.

C. palustre (L.) Scop. Pratal, etc. Common!

b. ferox Dr. Southerndown, *B.E.C.*, 455, 1927.

*Onopordon Acanthium L. Viatical. Rare. Aberthaw!, etc.

b. viride Michet. Canton, *J.B.*, 412, 1909.

*Silybum Marianum Gaertn. Viatical. Rare. Newton!, etc.

Serratula tinctoria L. Sylvestral, etc. Common.

b. alpina Gren. & Godr. Near Maesteg, *B.E.C.*, 578, 1924.

*Centaurea Jacea L. Adventive. Port Talbot, *J.B.*, 384, 1918.

C. obscura Jord. Pascual. Common. Cardiff, teste C. E. Britton.
C. nemoralis Jord. Pascual. Common. Penylan, etc.!, teste C. E. Britton.
*C. Cyanus L. Casual. Locally common!
C. scabiosa L. Septal, etc. Locally common. Thornhill, etc.!
  b. succisifolia E. S. M. Gower cliffs, *J.B. Supp.*, 39, 1907.
*C. Calcitrapa L. Adventive. Barry, *B.E.C.*, 732, etc., 1922.
*C. aspera Willd. Adventive. Established. Barry Docks!
*C. Solstitialis L. Adventive. Newton!, etc.
  b. Adami (Willd.). Aberdare, *J.B. Supp.*, 82, 1907.
C. melitensis L. Adventive. Splott!, etc.
*Carthamus tinctorius L. Adventive. Dinas Powis!, etc.
Cichorium Intybus L. Viatical, etc. Locally common!
Lapsana commumis L. Septal, Viatical. Common!
Picris Echioides L. Viatical, etc. Locally common. On lias near coast!
P. Hieracioides L. Septal, etc. Locally common. Gower, etc.!
  b. umbellata Schultz. Port Talbot, *J.B. Supp.*, 39, 1907.
Crepis paludosa (L.) Moench. Paludal, etc. Rare. Glyn Neath!
*C. biennis L. Viatical. Rare. Llandough!, etc.
C. capillaris (L.) Wallr. Agrestal, etc. Cardiff Docks!, *B.E.C.*, 403, 1927.
  b. agrestis (Willd.) Dr. Cadoxton, etc., *J.B. Supp.*, 40, 1907.
  c. anglica Dr. & Thell. Splott, *B.E.C.*, 403, 1927.
C. taraxacifolia Thuill. Agrestal, etc. Common!
*C. setosa Haller f. Casual. Splott!
Hieracium Pilosella L. Glareal. Common!
  b. concinnatum H. Lisvane, etc., *J.B.*, 405, 1909.
*H. colliniforme N. P. Established. Cardiff!, teste Bennett, extinct. Hb. Vachell.
H. brunneo-croceum Pugsley. (*J.B.*, 296, 1892, and *B.E.C.*, 881, 1925).
[H. melanocephalum. Aberdare, *J.B.*, 118, 1904].
H. Schmidtii Tausch. Craig-y-llyn, *J.B. Supp.*, 40, 1907.
H. eustomon Lint. Padell-y-Bwlch, *J.B.*, 405, 1909.
H. lasiophyllum Koch, b. euryodon H. Craig-y-llyn, etc., *J.B. Supp.*, 40, 1907.
H. argenteum Fr. Craig-y-llyn, etc., *J.B. Supp.*, 40, 1907.
H. nitidum B., b. siluriense H. Craig-y-llyn, *J.B. Supp.*, 40, 1907.
H. Hypochaeroides Gibs., b. saxorum H. Craig-y-llyn, *J.B. Supp.*, 40, 1907.
H. cambricum H. Graig Fawr, etc., *J.B. Supp.*, 40, 1907.
H. pellucidum Laest. Aberdare, *J.B.*, 312, 1902.
H. sublepistoides (Z.). Near Llanishen!, *B.E.C.*, 568, 1921.
H. crassiceps Dahlst. Lisvane, etc., *J.B.*, 405, 1909.
H. grandidens Dahlst. Llanedarne!, teste A. E. Wade.
H. cinderella Ley. Glyn Neath, etc., *J.B. Supp.*, 40, 1907.
H. lucidulum Ley. Glyn Neath, etc., *J.B. Supp.*, 40, 1907.

H. subulatidens D. Cwrt Colman, Bridgend, *B.E.C.*, 234, 1920.
b. cuneifrons Ley. Craig-y-llyn Fach, *J.B.*, 15, 1909.
H. Levanum Z. Darren Bwllfa, etc., *J.B. Supp.*, 40, 1907.
H. Diaphanoides Lindeb. Hendrefoilan, *B.E.C.*, 385, 1918.
H. vulgatum Fr. Gowerton, etc., *B.E.C.*, 385, 1918.
H. Lachenalii Gmel. Glyn Neath, *J.B.*, 197, etc., 1893.
H. mutabile Ley. Llwydcoed, *J.B.*, 312, 1902.
H. scanicum D.? Cefn On, *B.E.C.*, 568, 1921.
H. Jaccardii Z. Near Radyr, sp. H.J.R., National Museum of Wales.
H. subamplifolium Z. Aberdare, etc., *J.B.*, 312, 1902.
H. irriguum Fr. Hirwaun, *J.B. Supp.*, 40, 1907.
H. subglaucovirens Z. Aberdare, *J.B.*, 312, 1902.
[H. pulchrius Ley. (W.R.L.)? Radyr, H.J.R.]
H. cacuminatum D. Aberdare, etc., *J.B.*, 50, 1909.
H. barbariifolium Lönnr. Radyr, etc., *J.B.*, 405, 1909.
H. acroleucum Stenstr., b. daedalolepium D. Swansea, *J.B.*, 312, 1902.
H. caesium Fr. Craig-y-llyn, *J.B. Supp.*, 40, 1907.
[H. orarium Lindeb. Glamorgan, *J.B.*, 296, 1892.]
H. Amphiboloides Z. Glyn Neath, etc., *J.B. Supp.*, 40, 1907.
H. boreophilum Z. Hills behind Port Talbot, *J.B.*, 405, 1909.
H. tridentatum Fr. Fforest Newydd, *B.E.C.*, 385, 1918.
H. stictophyllum D. Craig-y-llyn, *J.B. Supp.*, 41, 1907.
b. serpentinum (H.). Aberdare, very rare, *J.B.*, 312, 1902.
H. substrigosum Z. Rhondda Valley, *J.B. Supp.*, 41, 1907.
H. trichocaulon D. Treorchy, sp. H.J.R., National Museum of Wales.
H. calcaricolum (H.) Z. Near Aberdare, very rare, *J.B. Supp.*, 41, 1907.
H. obatrescens D. Aberdare, very rare, *J.B. Supp.*, 41, 1907.
[H. scabrescens D. Llwydcoed, *J.B.*, 312, 1902.]
H. rigidum Hartm. Clyne Valley, etc., *B.E.C.*, 385, 1918.
H. Friesii Hartm. Treorchy, etc., *J.B. Supp.*, 41, 1907.
H. scabrisetum Z. Craig-y-llyn, etc., *J.B. Supp.*, 41, 1907.
H. cantianum H. In quantity about Aberdare, etc., *J.B.*, 312, 1902.
H. corymbosum Fr. Aberdare, etc., *J.B. Supp.*, 41, 1907.
H. opsianthum D. "Probably this," Aberdare, *J.B.*, 312, 1902.
H. umbellatum L. Llansannor, etc.!
b. coronopifolium Bernh. "Approaching this variety." Peterston, *J.B.*, 405, 1909.
H. obliquum Jord. Port Talbot, *J.B.*, 405, 1909.
Hypochaeris radicata L. Pascual. Common!
H. glabra L. Glareal. Rare. Kenfig Burrows, etc.!
Leontodon hispidus L. Pascual. Common!
L. autumnalis L. Pascual. Pratal. Common!
L. nudicaulis (L.) Banks. Pascual. Common!

TARAXACUM.

Sect. ERYTHROSPERMA.

T. BRACHYGLOSSUM D. The Leys!, *B.E.C.*, 104. 1932.
T. DECIPIENS Raunk. Penard, *B.E.C.*, 403, 1927.
T. FULVIFORME D. Newton Dunes!
T. FULVUM Raunk. Leckwith, *B.E.C.*, 404, 1927.
T. LACISTOPHYLLUM D. Cardiff, etc!, *B.E.C.*, 404, 1927.
T. LIMBATUM D. Kenfig, etc., *B.E.C.*, 31, 1926.

Sect. SPECTABILIA.

T. CROCEIFLORUM D. (m). Cardiff, *B.E.C.*, 404, 1927.
T. MACULIGERUM Lindb. f. Lavernock!, *B.E.C.*, 105, 1932.
T. NAEVOSUM D. Barry, *B.E.C.*, 122, 1926.
T. NORDSTEDTII D. Bridgend, *B.E.C.*, 736, etc., 1922.

Sect. VULGARIA D.

T. ALIENUM D. (m). Swansea Bay, *B.E.C.*, 30, 1926.
T. ANCISTROLOBUM D. (m). Cardiff, *B.E.C.*, 404, 1927.
T. ANGLICIFORME D. (m). Taff Fechan Gorge!, *B.E.C.*, 26, 1932.
T. CYANOLEPIS D. Swansea, *B.E.C.*, 404, 1927.
T. DUPLIDENTIFORME Dahlst. (m). Radyr, *B.E.C.*, 308, 1927.
T. EXPALLIDIFORME D. (f). Caerphilly, *B.E.C.*, 405, 1927.
T. HAMATUM Raunk. Caerphilly, *B.E.C.*, 405, 1927.
T. INTRICATUM Lindb. f. Radyr, B.E.C., 405, 1927.
T. KOEHLERI Dahlst. (m). Cardiff, *B.E.C.*, 309, 1927.
T. PALLESCENS D. (a). Leckwith, *B.E.C.*, 405, 1927.
T. PERLACINIATUM D. Penarth, *B.E.C.*, 309, 1927.
T. POLYODON D. (m). Radyr, *B.E.C.*, 405, etc., 1927.
T. PRERADIANS D. Radyr, *B.E.C.*, 309, 1927.
T. PRIVUM D. (var.). Caerphilly, etc., *B.E.C.*, 405, 1927.
T. SINUATUM D. Cardiff, *B.E.C.*, 309, 1927.
T. SUBLACINIOSUM D. Swansea, *B.E.C.*, 122, 1926.
T. SUBDILATATUM D. Barry, *B.E.C.*, 309, 1927.
*LACTUCA VIROSA L. Viatical. Rare. Porthcawl, *J.B.*, 317, etc., 1902.
*L. SERRIOLA L. Viatical. Locally common. Cardiff, etc.!, *B.E.C.*, 196, 1923.
  b. INTEGRATA (G. & G.) Dr. Cardiff, *B.E.C.*, 406, 1927.
*L. SALIGNA L. Viatical. Llandough!
L. MURALIS Fres. Septal, Rupestral. Common!
SONCHUS ARVENSIS L. Agrestal, etc. Common!
  b. LAEVIS (G. G. W.). Port Talbot Docks, *J.B. Supp.*, 42, 1907.
  c. ANGUSTIFOLIUS Meyer. Porthcawl, etc., *J.B. Supp.*, 42, 1907.
S. ASPER Hill. Agrestal, etc. Common!
  b. INTEGRIFOLIUS Lej. Cardiff, *B.E.C.*, 133, 1920.
  c. PUNGENS Bisch. Nash, *B.E.C.*, 455, 1927.
S. OLERACEUS L. Agrestal, etc. Common!
  b. GLANDULOSUS (Coss.) Dr. Cardiff Docks, *J.B. Supp.*, 42, 1907.
  c. CILIATUS (Lam.) Dr. Barry, B.E.C., 883, 1925.
*TRAGOPOGON PORRIFOLIUS L. Adventive. Barry Docks!, etc.

T. pratensis L. Pratal. Scarce. Penarth, etc., *Fl. Glam.*, 102.

b. minor (Mill.). Cardiff, etc.!

Lobelia Dortmanna L. Lacustral. Very rare. Llynfach, etc., *B.G.*, etc.

Jasione montana L. Glareal. Common!

b. littoralis Fries. Sker, etc., *J.B. Supp.*, 42, 1907.

Wahlenbergia hederacea Reichb. Uliginal. Locally common. Caerphilly, etc.!

(Phyteuma orbiculare L. Cowbridge, Fl. J.S., 43).

Campanula glomerata L. Pascual. Rare. St Donats to Dunraven!

C. latifolia L. Sylvestral. Rare. Hendrefoilan, etc.!, *B.E.C.*, 388, 1921.

C. Trachelium L. Sylvestral. Scarce. Near St Hilary, etc.!

*(C. Rapunculoides L. Sylvestral. Merthyr Mawr, *J.B.*, 317, 1902).

C. rotundifolia L. Glareal. Common. In hilly districts!

(C. patula L. Vale of Glamorgan?, L.W.D. Mat., 29).

Legousia hybrida (L.) Del. Near Porthcawl, Lloyd, etc.

Vaccinium Myrtillus L. Ericetal. Locally common!

V. Vitis-idaea L. Ericetal. Rare. Craig-y-llyn!

Oxycoccus quadripetala Gilib. Uliginal. Rare. Mynydd-y-glew, etc.!

Andromeda Polifolia L. Uliginal. Crumlin Bog, Hb. Brit. Mus.

Calluna vulgaris (L.). Ericetal. Common!

Erica cinerea L. Ericetal. Locally common. Mynydd-y-glew, etc.!

E. Tetralix L. Ericetal. Locally common. Mynydd-y-glew, etc.!

(E. ciliaris L. Llantwit Fardre, *J.B. Supp.*, 43, 1907).

(E. vagans L. Near Newton, etc., *B.G.*).

(E. mediterranea L., b. hibernica Hook. & Arn. Pontardulais, *B.G.*).

*Rhododendron ponticum L. Established. Langland, seeding freely, *B.E.C.*, 134, 1920.

Pyrola minor L. Sylvestral. Ysgwd Eynon Gam, above the Fall, L.W.D. Mat., 38. (Glamorgan ?).

P. secunda L. Ericetal. Craig-y-llyn, two localities, *Fl. Glam.*, 105.

Monotropa Hypopitys L., b. glabra Roth. Sylvestral. Uliginal. Rare. Kenfig Dunes, etc.!, *B.E.C.*, 407, 1927.

Statice Limonium L. emend. Littoral. Locally common. Penarth Ferry, etc.!

b. pyramidale (Dr.). Port Eynon, Hb. A. Bennett, *J.B.*, 13, 1905.

S. binervosa G. E. Sm. Littoral. Locally common. Dunraven!

S. pubescens (Sm.). Littoral, Rupestral. Locally common!

Primula vulgaris Huds. Sylvestral. Common!

b. caulescens (Koch). Scarce!

P. variabilis Goupil. Pratal. Scarce. Dinas Powis, etc.!

P. veris L. Pratal. Locally common!

*Cyclamen hederifolium Ait. Coedryglan, "no doubt planted," Fl. J.S., 69, etc.

Lysimachia vulgaris L. Paludal. Locally common. Kenfig, etc.!

*L. punctata L. Paludal. Established. Cwrt-yr-ala!, *B.E.C.*, 126, 1929.

L. NUMMULARIA L. Pratal. Locally common. Cwrt-yr-ala, etc.!

L. NEMORUM L. Sylvestral. Common!

GLAUX MARITIMA L. Littoral. Locally common. Salt marshes, etc.!

ANAGALLIS TENELLA Murr. Uliginal. Locally common. Kenfig Burrows, etc.!

A. ARVENSIS L. Glareal, Agrestal. Common!

b. CARNEA Schrank. Ogmore Castle, E.S.M., *J.B. Supp.*, 44, 1907.

c. PALLIDA Hook. f. Penylan!

d. VERTICILLATA Diard. Splott!

A. FOEMINA Mill. Agrestal, Viatical. Lavernock, etc.!

CENTUNCULUS MINIMUS L. Ericetal. Rare. Sker, etc.!

SAMOLUS VALERANDI L. Paludal, etc. Locally common. Sker, etc.!

FRAXINUS EXCELSIOR L. Sylvestral, etc. Common!

LIGUSTRUM VULGARE L. Sylvestral, etc. Common!

*VINCA MAJOR L. Established. Swanbridge, etc.!

*V. MINOR L. Sylvestral. Established. Lisvane, etc.!

BLACKSTONIA PERFOLIATA Huds. Pascual. Locally common. Dunes, etc.!

ERYTHRAEA CENTAURIUM Pers. Glareal. Common!

b. CAPITATA Koch. Kenfig Pool, *J.B.*, 248, 1902.

c. ELLIPTICUM Dr. Kenfig, *B.E.C.*, 569, 1919 (as *Centaurium*).

d. CONFERTA Wh. & S. Kenfig Dunes!, sp. Hb. Vachell, teste C. E. Salmon.

e. SUBLITORALIS Wh. & S. Kenfig Dunes!

CENTAURIUM VULGARE Rafn. Many records: all, including *T.B.* and *B.E.C.*, 1923, doubtless refer to var. *sublitoralis* Wh. & S.

C. PULCHELLUM (Sw.) Dr. Glareal. Locally common. Kenfig Dunes, etc.!

b. SIMPLICISSIMUM (Schmidt). Kenfig Dunes!, teste J. S. L. Gilmour.

C. CAPITATUM (Willd.) Dr. Glareal. Rare. Gower, *B.E.C.*, 361, etc., 1930.

(GENTIANA PNEUMONANTHE L. Oystermouth to Newton, *J.B. Supp.*, 45, 1907).

G. AMARELLA L. Glareal. Dinas Powis, etc.!

G. SEPTENTRIONALIS Dr.? Glareal. Scarce. Kenfig Dunes, *B.E.C.*, 311, 1927.

G. CAMPESTRIS L. Pascual. Rare. Pendoylan!, etc.

b. BALTICA (Murb.). Sker Dunes!

MENYANTHES TRIFOLIATA L. Paludal, local. Gower, etc.!

*NYMPHOIDES PELTATUM Rend. & Br. Introduced. Clyne Ponds, *B.E.C.*, 885, 1925.

*POLEMONIUM CAERULEUM L. Adventive. Aberdare, *J.B. Supp.*, 83, etc., 1907.

*HELIOTROPIUM EUROPAEUM L. Casual. Splott!

CYNOGLOSSUM OFFICINALE L. Viatical, etc. Locally common. Dunes, etc.!

b. SUBGLABRUM Mérat. Kenfig, etc., *J.B. Supp.*, 45, 1907.

*C. GERMANICUM Jacq. Casual. Near Cardiff, Fl. J.S., 113.
*LAPPULA ECHINATA Gilib. Casual. Llandaff Mill, etc.!
*ASPERUGO PROCUMBENS L. Casual. Splott!, etc.
SYMPHYTUM OFFICINALE L. Paludal. Common. Dinas Powis, etc.!
(b. PATENS Sibth. Port Talbot, *J.B. Supp.*, 45, 1907).
*S. PEREGRINUM Ledeb. Pencisely, etc., teste A. E. Wade.
*BORAGO OFFICINALIS L. Adventive. Marcross, etc.!
*ANCHUSA SEMPERVIRENS L. Viatical. Locally common! Dunes, native?
*A. OFFICINALIS L. Aberavon, *B.E.C.*, 388, etc., 1918.
LYCOPSIS ARVENSIS L. Agrestal, etc. Locally common. Dunes, etc.!
*PULMONARIA OFFICINALIS L. Established. Penllergaer, *B.E.C.*, 388, etc., 1918.
*P. LONGIFOLIA Bor. Near Swansea, *Sw. Sc. Soc. Procs.*, 1891-2.
MYOSOTIS PALUSTRIS Hill. Paludal. Locally common. Sant-y-nil, etc.!
b. STRIGULOSA (Reichb.). Near Aberdare, *J.B. Supp.*, 45, 1907.
M. REPENS G. & D. Don. Uliginal. Scarce. Penard!, etc.
M. CAESPITOSA K. F. Schultz. Paludal. Sant-y-nil, etc.!
*M. ALPESTRIS Schmidt. Introduced in an orchard, Mayals, *B.E.C.*, 584, 1924.
M. SYLVATICA (Ehrh.) Hoffm. Sylvestral. Pendoylan, native?! Established. Locally common.
M. ARVENSIS (L.) Hill. Agrestal, Glareal, etc. Common!
b. SYLVESTRIS (Schlecht.). Sully Island, *J.B. Supp.*, 45, 1907.
M. COLLINA Hoffm. Glareal. Locally common. Near coast, etc.!
b. MITTENII Baker. Penard Dunes, etc., *J.B. Supp.*, 46, 1907.
M. VERSICOLOR Sm. Glareal. Locally common. Southerndown, etc.!
LITHOSPERMUM OFFICINALE L. Sylvestral. Scarce. Gower, etc.!
L. PURPUREO-CAERULEUM L. Local. Copses, etc., near coast. Dunraven, etc.!
*L. ARVENSE L. Casual. Near Docks!
ECHIUM VULGARE L. Littoral. Locally common. Dunes, etc.!
b. PUSTULATUM S. & S. Barry Docks!, *B.E.C.*, 276, 1930.
*(E. PLANTAGINEUM L. Casual. Barry, *B.E.C.*, 201, 1923. Error?)
CALYSTEGIA SEPIUM Br. Septal. Common!
C. SOLDANELLA Br. Glareal, local. Dunes along coast!
CONVOLVULUS ARVENSIS L. Agrestal, etc. Common!
CUSCUTA EUROPAEA L. Septal. Newton sands, non-flowering!?, *J.B. Supp.*, 46, 1907.
C. EPITHYMUM (L.) Murray. Ericetal. Rare. Dunraven!, etc.
*C. TRIFOLII Bab. Agrestal. Pontcanna. On *Trifolium pratense*, etc., *Fl. Glam.*, 115.
*LYCOPERSICON LYCOPERSICUM (L.). Outcast. Locally common. Waste ground!
SOLANUM DULCAMARA L. Septal, etc. Common!
b. MARINUM Bab. Oxwich, etc., *J.B. Supp.*, 46, 1907.
S. NIGRUM L. Agrestal. Viatical. Locally common!

*LYCIUM CHINENSE Mill. Established, chiefly near coast. Swanbridge, etc.!

ATROPA BELLADONNA L. Sylvestral, etc. Rare. Boverton!, etc.

*DATURA STRAMONIUM L. Casual. Waste ground and dunes!

HYOSCYAMUS NIGER L. Viatical. Locally common. Southerndown, etc.!

*H. ALBUS L. Near Shrimphouse; Barry, *B.E.C.*, 201, 1923.

VERBASCUM THAPSUS L. Viatical, etc. Locally common. Gower, etc.!

*V. VIRGATUM Stokes. Established. Railway, Cardiff to Penarth!

*V. BLATTARIA L. Adventive. Rare. Splott!, etc.

*V. PULVERULENTUM Vill. Adventive. Barry, *B.E.C.*, 201, 1923.

*V. LYCHNITIS L. Casual. "Ballast," Cardiff, Fl. J.S., 61.

V. NIGRUM L. Viatical. Rare. Near Cardiff!, etc.

LINARIA VULGARIS Mill. Septal. Glareal. Common!

b. PELORIA. Penarth Ferry, 1893, *Fl. Glam.*, 118.

*L. PURPUREA Mill. Adventive. Swansea, Gutch, etc.

*L. REPENS (L.) Mill. Viatical. Scarce. Railway banks, etc.!

*L. PELISSERIANA Mill. Casual. Swansea Dock, *B.E.C.*, 669, 1919.

*L. SUPINA Desf. Casual. "Ballast," Cardiff, Fl. J.S., 60.

L. MINOR (L.) Desf. Agrestal. Viatical. Locally common. Railway lines, etc.!

b. PRAETERMISSA (Delast.). Cardiff, *B.E.C.*, 312, 1927.

L. SPURIA (L.) Mill. Agrestal. Scarce. St Hilary, etc.!

L. ELATINE (L.) Mill. Agrestal, etc. Scarce. Southerndown, etc.!

L. CYMBALARIA (L.) Mill. Rupestral, Littoral. Common, apparently native on pebble ridges!

*ANTIRRHINUM MAJUS L. Adventive on walls. Cogan!, etc.

A. ORONTIUM L. Agrestal. Rare. Horton!; Casual. Waste ground!

b. CALYCINUM (Lam.). Casual. Splott!

SCROPHULARIA AQUATICA L. Paludal. Common!

b. CINEREA (Dum.). Gowerton, etc., *J.B. Supp.*, 47, 1907.

S. NODOSA L. Sylvestral. Common!

b. BOBARTII Pryor. Sully Island!, *B.E.C.*, 496, 1916.

c. BRACTEATA Dr. Cardiff, *J.B.*, 406, 1909.

S. SCORODONIA L. Septal. Rare. Porthcawl sandhills, *J.B.*, 317, 1902.

*S. CANINA L. Established. Cardiff Docks, *B.E.C.*, 202, 1923.

b. PINNATIFIDA (Brot.). Established. Cardiff Docks, *B.E.C.*, 1020, 1925.

*MIMULUS GUTTATUS DC. Lacustral. Locally common. Established recently in many places!

*M. MOSCHATUS Dougl. Uliginal. Established. Caerphilly mountain!, etc.

LIMOSELLA AQUATICA L. Lacustral. Very rare. Kenfig!

b. TENUIFOLIA Lej. Rare. Kenfig Burrows!

SIBTHORPIA EUROPAEA L. Uliginal. Very rare. Garth mountain at 800 ft.!

DIGITALIS PURPUREA L. Septal, etc. Common!

(VERONICA HYBRIDA L., as *spicata* (?), *T.B.*, 287. "Sides of mountains," L.W.D. Mat., etc.).

V. OFFICINALIS L. Ericetal, etc. Common!

V. CHAMAEDRYS L. Sylvestral. Common!

V. MONTANA L. Sylvestral. Locally common. Sant-y-nil, etc.!

V. SCUTELLATA L. Uliginal. Locally common. Gower, etc.!

b. VILLOSA Schum. Blackpill, *B.E.C.*, 390, 1918.

V. BECCABUNGA L. Paludal. Common!

V. ANAGALLIS L. Paludal. Scarce. Kenfig!, teste N. Y. Sandwith.

V. AQUATICA Benq. Paludal. Locally common. Oxwich!, etc., teste N. Y. Sandwith.

V. SERPYLLIFOLIA L. Agrestal, etc. Common!

V. ARVENSIS L. Glareal, etc. Common!

*V. TOURNEFORTII Gmel. Agrestal. Common!

b. KOCHIANA Godr. Llandaff!, teste E. Drabble.

c. ASCHERSONIANA (Lehm.). Near Cardiff!, teste E. Drabble.

V. AGRESTIS L. Agrestal. Common!

V. DIDYMA Ten. Agrestal. Common!

V. HEDERIFOLIA L. Agrestal. Common!; Sylvestral. Rare. Cwrt-yr-ala!

b. TRILOBA (Opiz) Beck. Dinas Powis, *B.E.C.*, 519, 1930.

Euphrasias, according to "A Revision of the British Euphrasias" by Mr H. W. Pugsley, who gives the following list which cancels all former erroneous records for Glamorgan:—

EUPHRASIA BOREALIS Wettst. Ericetal. Llwydcoed, H.J.R., teste H. W. Pugsley.

E. BREVIPILA Burnat & Gremli. Ericetal. Pontneddvaughan, H.J.R., teste H. W. Pugsley.

E. NEMOROSA Pers. Ericetal. Dinas Powis!, etc., teste H. W. Pugsley.

E. CURTA (Fr.) Wettst., f. LITTORALIS. Ericetal. Welsh St Donats, *J.B. Supp.*, 48, 1907.

E. OCCIDENTALIS Wettst. Ericetal. Porthcawl!, etc., teste H. W. Pugsley.

E. ANGLICA Pugsl. Ericetal. St Donats.

BARTSIA VISCOSA L. Paludal. Rare. Gower, etc.!

B. ODONTITES Huds. Pascual, etc. Agg., common!

b. VERNA (Reichb.). Rhossili, etc., *J.B. Supp.*, 48, 1907.

c. SEROTINA (Bertol.). Southerndown!

PEDICULARIS PALUSTRIS L. Paludal. Locally common. Kenfig, etc.!

P. SYLVATICA L. Ericetal. Common!

RHINANTHUS CRISTA-GALLI L. Pratal. Common!

MELAMPYRUM PRATENSE L. Sylvestral. Common!

b. MONTANUM (Johnston). Rhigos, etc., *J.B. Supp.*, 49, 1907.

c. HIANS (Dr.). Aberdare, etc., *J.B. Supp.*, 49, 1907.

OROBANCHE RAPUM-GENISTAE Thuill. Parasitic on broom, etc. Scarce. Radyr!, etc.

(O. VULGARIS Poir. Gower, Lloyd).

(O. ALBA Steph. No locality given, Gutch).

O. MAJOR L. Agrestal. Very rare. Port Talbot, *J.B. Supp.*, 49, etc., 1907.

O. HEDERAE Duby. Sylvestral. Locally common. Parasitic on Ivy. Cardiff, etc. !

O. MINOR Sm. Agrestal. Parasitic on clover. Near Cottrel, etc. !
  b. CONCOLOR Duby. (as *flavescens* ? Reut.) on *Volvulus sepium*. Port Eynon, *B.E.C.*, 392, 1921.

(O PURPUREA Jacq. (as *caerulea*). "Hilly pastures," Swansea Guide).

LATHRAEA SQUAMARIA L. Sylvestral. Saprophytic on elms, etc. Locally common. Cardiff, etc. !

UTRICULARIA VULGARIS L. Lacustral. Neath, etc., Flower and Lees.

U. MAJOR Schmidel. Lacustral. Rare. Oxwich Marsh !, *B.E.C.*, 365, 1930.

U. MINOR L. Lacustral. Very rare. Penclun Marsh !, *B.E.C.*, 392, 1918.

PINGUICULA VULGARIS L. Uliginal. Locally common. Margam Burrows !, etc.

(P. LUSITANICA L. Llangynwyd, Fl. J.S., 68).

VERBENA OFFICINALIS L. Viatical. Locally common. About old villages !

MENTHA ROTUNDIFOLIA (L.) Huds. Pratal. Locally common. Whitchurch, etc. !
  b. BAUHINI (Tenore). Parkmill, *J.B.*, 407, 1909.

M. ALOPECUROIDES Hull. Llanmadoc, etc., *Sw. Sc. Soc. Procs.*, 63, 1929.

M. LONGIFOLIA (L.) Huds. Paludal. Scarce. Glyn Neath, *J.B.*, 297. 1892.
  b. NEMOROSA (Willd.). Peterstone-super-Ely, sp. Hb. Vachell, teste J. Fraser.
  c. MOLLISSIMA (Borckh.). Peterstone-super-Ely, teste J. Fraser.
  d. NICHOLSONIANA (Strail) Dr. Canton, *B.E.C.*, 741. 1922.
  e. VILLOSA (Huds.). Peterstone-super-Ely, H.J.R., teste J. Fraser.

*M. SPICATA Huds. Viatical. Scarce. Aberthin, etc. !

*M. CRISPA (L.). Llwydcoed, H.J.R., teste J. Fraser.
  *× PIPERITA L. Paludal. Scarce. Dinas Powis, *B.E.C.*, 443, 1932.
    b. VULGARIS Sole. Oxwich, etc., *J.B. Supp.*, 50, 1907.
    c. SUBCORDATA Fraser. Caerphilly !, teste J. Fraser.

M. AQUATICA L. Paludal. Common !
  b. SUBGLABRA (Baker). Aberthin !, *B.E.C.*, 412, 1927.
  c. MAJOR Sole. Aberthin !, *B.E.C.*, 128, 1926.
  × VERTICILLATA (L.), b. PALUDOSA (Sole) Dr. Paludal. Locally common. Gower, etc. !
    c. PARVIFLORA (H. Braun). Gower !, teste J. Fraser.
    d. OVALIFOLIA (Opiz) Briq. Aberthin, etc. !, *B.E.C.*, 412, 1927.
  e. ADULTERINA Briq. Aberthin. *B.E.C.*, 128. 1926.
  f. ACUTIFOLIA Sm. Aberthin !, *B.E.C.*, 128, 1926.
  g. RIVALIS Briq. Near Hirwaun !, teste J. Fraser.

×gentilis L. Paludal. Blackhills, Gower, *B.E.C.*, 673, 1919.

b. Pauliana (Schultz). Penard Castle, 1894, E. F. Linton.

×rubra Huds. Paludal, etc. Rare. Hirwaun, *J.B. Supp.*, 50, 1907.

b. raripila Briq. Glam., J. R. Shepherd, 1911.

M. arvensis L. Agrestal, etc. Common!

b. obtusifolia Lej. & Court. Aberthin!, teste J. Fraser.

c. agrestis (Sole) Sm. Aberdare, *J.B. Supp.*, 50, 1907.

d. austriaca (Jacq.) Briq. Barry. *B.E.C.*, 128, 1926.

e. parietariifolia Beck. Llwydcoed, H.J.R., teste J. Fraser.

f. densifoliolata Briq. Gower!

M. Pulegium L. Inundatal. Local. Aberthin!

*M. Requieni Benth. Adventive. Penllergaer, *J.B. Supp.*, 84, 1907.

Lycopus europaeus L. Paludal, etc. Common!

Origanum vulgare L. Pascual. Locally common. Dry calcareous banks, etc.!

b. albiflorum Lej. Gower, *B.E.C.*, 393, 1921.

Thymus Pulegioides L. (as Chamaedrys Fr.). Glyn Neath, *B.E.C.*, 510, 1927. *Com. Fl.*

T. Serpyllum L. Pascual. Common. Barry, etc.! *B.E.C.*, 512, 1927.

T. pycnotrichus (Uechtr.) Ronn. Pascual. Barry Island, *B.E.C.*, 513, 1927.

T. zetlandicus Ronn. & Dr. Pascual. Cold Knap, *B.E.C.*, 514, 1927.

T. neglectus Ronn. Pascual. Barry, *B.E.C.*, 515, 1927.

T. britannicus Ronn. Pascual. Caerphilly, *B.E.C.*, 516, 1927.

Satureia ascendens (Jord.) Dr. Glareal, etc. Locally common. St Fagans!

b. Briggsii (Syme). St Andrews!

*S. Nepeta (L.) Scheele. Adventive. Cardiff Docks, *B.E.C.*, 742, 1922.

S. Acinos (L.) Scheele. Rupestral, etc. Local. Gower, etc.!

Clinopodium vulgare L. Septal, etc. Locally common. Cwrt-yr-ala.

*Melissa officinalis L. Outcast. Newton, etc.!, *B.E.C.*, 498, 1916.

*Salvia pratensis L. Adventive. Merthyr Mawr, *J.B. Supp.*, 85, 1907.

S. Verbenaca L. Pascual. Common. Gower, etc.!

*S. verticillata L. (as pratensis, Swansea Guide). Adventive. Port Eynon, etc.!

Nepeta Cataria L. Septal. Rare. Kenfig, etc.!

N. hederacea (L.) Trev. Sylvestral. Common!

b. parviflora (Benth.). Morlais Castle, *J.B. Supp.*, 51, 1907.

Scutellaria galericulata L. Paludal. Locally common. Gower, etc.!

b. littoralis Dr. Kenfig Dunes, etc., *B.E.C.*, 315, 1927.

S. minor Huds. Uliginal. Locally common. Kenfig, etc.!

Prunella vulgaris L. Pascual. Common!

b. dunensis Dr. Whitford Point, *B.E.C.*, 48, 1917.

*Melittis Melissophyllum L. Adventive. About Swansea, Dillwyn, etc.

Marrubium vulgare L. Viatical. Uliginal. Scarce. Near coast, Sker, etc.!

Stachys sylvatica L. Sylvestral. Common!

×ambigua Sm. Septal. Rare. Aberthin!, etc.

S. palustris L. Paludal, etc.!

S. arvensis L. Agrestal. Locally common. St Donats!

*S. annua L. Adventive. Cardiff, etc!, *B.E.C.*, 207, 1923.

*S. recta L. Established. Barry Docks!, *B.E.C.*, 207, 1923.

S. officinalis (L.) Trevis. Sylvestral. Locally common. Llansannor, etc.!

b. hirta (Leyss.) Rouy. Monknash Cwm!, *B.E.C.*, 315, 1927.

Galeopsis speciosa Mill. Agrestal. Rare. Gowerton to Penclawdd, *J.B.*, 316, 1892.

G. Tetrahit L. Sylvestral, Agrestal. Common!

b. bifida (Boenn.) Lej. & Court. Radyr, etc., *J.B.*, 407, 1909.

c. nigrescens Bréb. Wenvoe, *B.E.C.*, 207, 1923.

G. Ladanum L., b. angustifolia Pers. Scarce. Agrestal, and pebble beaches!

c. canescens Schultz? Barry!, *B.E.C.*, 132, 1929.

*Leonurus Cardiaca L. Viatical. Rare. Aberthin, etc.!

Lamium album L. Viatical. Common!

*L. maculatum L. Outcast. Scarce. Pentyrch, etc.! (*B.E.C.*, 207, 1923.)

L. purpureum L. Agrestal, etc. Common!

L. hybridum Vill. Viatical. Scarce. Kenfig, etc!, *B.E.C.*, 413, 1927.

b. decipiens Sond. Gower, *J.B.*, 297, 1892.

(L. moluccellifolium Fr. Llandaff, etc., Fl. J.S., 64. Error).

L. amplexicaule L. Agrestal. Scarce. Kenfig, etc.!

L. Galeobdolon (L.) Crantz. Sylvestral. Common!

Ballota nigra L. Viatical. Locally common. Dinas Powis, etc.!

b. mollissima Dr. Kenfig!, *B.E.C.*, 414, 1927.

Teucrium Scorodonia L. Sylvestral. Common!

b. dentatum Bab. Killay, *B.E.C.*, 395, 1918.

*T. Chamaedrys L. Rupestral. Rare. Penrheolgerrig, *Cardiff Nat. Soc. Procs.*, 1891-2.

Ajuga reptans L. Sylvestral. Common!

*Plantago indica L. Adventive. Established ?. Cardiff!, *B.E.C.*, 743, 1922.

P. Coronopus L. Glareal. Wenvoe. Littoral, along coast!

b. ceratophyllon Rapin. Grangetown, etc.!

c. maritima Gren. & Godr. Blackpill, *B.E.C.*, 395, 1918.

d. pygmaea Lange. Merthyr Mawr Dunes, *B.E.C.*, 393, etc., 1921.

e. tenuifolia Wirtg. Cardiff, *B.E.C.*, 207, 1923.

P. maritima L. Littoral. Locally common along coast!

b. scorzonerifolia (Lam.). Grangetown!, etc.

P. lanceolata L. Pascual, etc. Common!

*b. Timbali (Jord.). Port Talbot, *J.B.*, 408, 1909.

c. altissima (L.). Barry, *B.E.C.*, 129, 1926.
d. sphaerostachya Roche. Ewenny Down, etc., *J.B. Supp.*, 52, 1907.
P. media L. Pascual. Locally common. On lias near coast!
P. major L. Pascual, etc. Common!
b. intermedia (Gilib.) Syme. Kenfig, etc., *J.B. Supp.*, 52, 1907.
*P. Psyllium L. Casual. Cardiff, Fl. J.S. (notes).
*P. Lagopus L. Adventive. Splott!
Littorella uniflora (L.) Asch. Lacustral. Locally common!
*Herniaria glabra L. Casual. Cardiff, Fl. J.S., 36.
*H. ciliata Bab. Established. Barry, *B.E.C.*, 1021, 1925.
*H. hirsuta L. Casual. Cardiff, *B.E.C.*, 1021, 1925.
*Corrigiola littoralis L. Casual. Barry Docks!, *B.E.C.*, 414, 1927.
*Scleranthus perennis L. Casual. Cardiff Docks, Fl. J.S., 74.
S. annuus L. Agrestal. Scarce. Near Cardiff!
*Amarantus chlorostachys (Willd.) Thell. Adventive. Appearing yearly, Cardiff, etc.!
*A. retroflexus L. Adventive. Barry, appearing yearly!
b. Delilei Thell. Cardiff, *B.E.C.*, 591, 1924.
*A. albus L. Adventive. Cardiff, appearing yearly!, *B.E.C.*, 129, 1926.
*A. Blitum L. Penarth, etc., Fl. J.S., 70, etc.
Chenopodium rubrum L. Viatical. Common!
b. Blitoides Wallr. Cardiff, *B.E.C.*, 891, 1925.
c. Pseudo-botryoides Wats. Pond sides, etc. Kenfig Burrows!
*C. Bonus-Henricus L. Viatical. Locally common. Rhiwbina, etc.!
*C. hybridum L. Adventive. Splott!
*C. urbicum L. Viatical. Aberthaw, *B.E.C.*, 367, 1930.
b. intermedium (M. & K.) Moq. Aberthaw!, *B.E.C.*, 208, 1923.
*C. murale L. Viatical, local. Cardiff, etc.!
*C. opulifolium Schrad. Adventive. Cardiff!, *B.E.C.*, 754, 1928.
b. mucronulatum G. Beck. Barry. *B.E.C.*, 130, 1926.
C. album L. Agrestal, etc. Common!
b. viride (L.). Aberdare, *J.B. Supp.*, 53, 1907.
c. glomerulosum (Reichb.). Leckwith, *B.E.C.*, 744, etc., 1922.
d. paucidens (Murr) Dr. Radyr, *B.E.C.*, 394, etc., 1921.
e. viridescens St Amans. Cardiff, *B.E.C.*, 143, etc., 1920.
f. pseudo-Borbasii (Murr) Dr. Grangetown, *B.E.C.*, 744, 1922.
g. pseudostriatum (Zschacke). Barry, *B.E.C.*, 130, 1926.
h. substriatum (Murr). Cardiff Dock, *B.E.C.*, 593, 1924.
*C. leptophyllum (Nutt.) Britt. & Br. Adventive. Splott, etc.!, *B.E.C.*, 395, 1921.
*C. ficifolium Sm. Adventive. Cardiff, Fl. J.S., 72.
*C. glaucum L. Viatical, local. Near Llandough, etc.!
*C. vulvaria L. Adventive. Splott!, etc.
C. polyspermum L. Agrestal, Viatical, etc. St Nicholas, etc.!
b. obtusifolium Gaud. Cardiff, *J.B.*, 412, 1909.
*Roubieva multifida Moq. Adventive. Established. Barry!, etc. (*B.E.C.*, 1022, 1925).

BETA MARITIMA L. Littoral. Locally common. Sully, etc.!

ATRIPLEX LITTORALIS L. Littoral. Locally common. Penarth Ferry, etc.!

b. SERRATA Gray. Port Talbot, *J.B. Supp.*, 53, etc., 1907.

A. PATULA L. Agrestal, Viatical. Common!

b. ERECTA Lange. Llandaff, etc., *J.B.*, 408, 1909.

c. BRACTEATA Westerlund. Cardiff, *B.E.C.*, 145, 1920.

d. ELONGATA Dr. Cardiff, *B.E.C.*, 873, 1928.

A. HASTATA L. Agrestal, Viatical. Common!

A. DELTOIDEA Bab. Viatical. Locally common. Penarth Ferry, etc.!

b. PROSTRATA Bab. Penarth Ferry!

A. GLABRIUSCULA Edmondst., b. BABINGTONII (Woods) Dr. Littoral. Locally common!

A. MARITIMA Hallier. Littoral. Rare. Jersey Marine, etc., *J.B. Supp.*, 53, 1907.

*A. TATARICA L. Adventive. Cardiff!, etc., *B.E.C.*, 745, 1922.

A. PORTULACOIDES L. Littoral. Locally common. Aberthaw, etc.!

*A. PEDUNCULATA L. Casual. Aberafan, Hb. Motley.

Salicornias arranged according to the revision by C. E. Moss and E. J. Salisbury, D.Sc., F.L.S., in the *Cambridge British Flora*.

(SALICORNIA PERENNIS, a. RADIANS Moss & Salisb. Swansea, *B.G.*, *Cambridge Br. Flora*).

(b. LIGNOSA Moss. Near Cardiff!, *B.E.C.*, 396, 1921. Error, A. J. Wilmott).

S. DOLICHOSTACHYA Moss. Grangetown!, *B.E.C.*, 368, 1930, teste Dr Salisbury.

S. HERBACEA, a. STRICTA Moss. & Salisb. Grangetown!, teste Dr Salisbury.

b. PATULA Moss. & Salisb. Oxwich, Hb. Watson.

S. RAMOSISSIMA Woods. The Leys!, teste Dr Salisbury.

S. PROSTRATA, a. SMITHIANA Moss. & Salisb. The Leys!, teste A. J. Wilmott.

S. DISARTICULATA Moss. The Leys!, teste Dr Salisbury, *B.E.C.*, 368, 1930.

SUAEDA FRUCTICOSA Forsk. Littoral. Very rare. Penarth Ferry, *B.E.C.*, 368, 1930.

S. MARITIMA Dum. Littoral. Locally common. Cogan, etc.!

b. PROCUMBENS Syme. Gower, *J.B. Supp.*, 54, 1907.

SALSOLA KALI L. Littoral. Locally common. Sands!

b. TENUIFOLIA Tausch. Cardiff, *B.E.C.*, 892, 1925.

*PHYTOLACCA AMERICANA L. Adventive. Cardiff Docks!

POLYGONUM DUMETORUM L. "Garden weed." Sully, *Fl. Glam.*, 136.

P. CONVOLVULUS L. Agrestal. Common!

b. SUBALATUM Lej. & Court. Swambridge, *Fl. Glam.*, 136.

P. BISTORTA L. Pratal. Scarce. Schwyl!, etc.

P. AMPHIBIUM L. Lacustral, etc. Kenfig, etc.!

b. TERRESTRE Leers. Lavernock!

P. scabrum Moench. Agrestal, etc. Common. Cardiff, etc.!
b. incanum (Lej. & Court.). Near Gorseinon, *J.B. Supp.*, 55, 1907.
P. Persicaria L. Agrestal, etc. Common!
b. elatum Gren. & Godr. Fairwater, etc.!
c. agreste Meisn. Near Cardiff!
*P. petecticale (Stokes) Dr. Agrestal, etc. Common. Taff River, etc.!
P. Hydropiper L. Paludal. Common!
(P. mite Schrank. Swansea, Gutch, etc.).
P. minus Huds. Inundatal. Swansea, *Phyt.*, 144, etc., 1842.
(P. maritimum L. Littoral. Cardiff, etc., Fl. J.S., 73).
P. Raii Bab. Littoral. Locally common. Aberthaw, etc.!
P. aviculare L. Agrestal, etc. Common!
b. agrestinum (Jord.). Porthcawl, etc., *J.B. Supp.*, 54, 1907.
c. brevifolium S. F. Gray. Oxwich, etc., *J.B. Supp.*, 54, 1907.
d. angustifolium S. F. Gray. Cardiff, etc., *J.B. Supp.*, 54, 1907.
e. marinum S. F. Gray. Port Talbot, etc., *J.B. Supp.*, 54, 1907.
f. depressum Meisn. Port Talbot, *B.E.C.*, 30, 1911.
P. equale Lind. Agrestal. Scarce. Cardiff!
*P. patulum M. Bieb. (Bellardi auct.). Casual. Splott, etc., *B.E.C.*, 594, 1924.
*P. cuspidatum Sieb. & Zucc. Outcast, often established!, *B.E.C.*, 594, 1924.
*Fagopyrum sagittatum Gilib. Casual. About Cardiff!
Rumex Hydrolapathum Huds. Paludal. Locally common. Hensol, etc.!
R. crispus L. Agrestal, etc. Common!
b. trigranulatus Syme. Cadoxton Moors, etc.!
R. obtusifolius L. Pratal, etc. Common!
*R. sanguineus L. Viatical. Swansea Valley, *B.E.C.*, 397, 1918.
R. viridis (Sibth.). Sylvestral. Common!
R. conglomeratus Murr. Viatical. Common!
R. rupestris Le Gall. Littoral. Rare. Kenfig Dunes!, *J.B.*, 16, 1933.
R. pulcher L. Viatical. Newton, etc.!
R. maritimus L. Swansea foreshore, *B.E.C.*, 416, 1927.
R. Acetosa L. Pratal. Common!
R. Acetosella L. Ericetal. Common!
b. M'Leanii Dr. Near Taffs Well. *B.E.C.*, 60, 1923.
*R. scutatus L. Adventive. Cornely. Gutch.
*R. salicifolius Weinm. Adventive. Splott, etc.!
*(Asarum europaeum L. Cardiff Castle gardens. Fl. J.S., 109).
Daphne Laureola L. Sylvestral. Locally common. Cwrt-yr-ala, etc.!
D. Mezereum L. Sylvestral. Draethen. *J.B.*, 408, etc., 1909.
*Hippophae Rhamnoides L. Established. Sand dunes in several places, *B.E.C.*, 746, 1922.
Viscum album L. Sylvestral. Very rare. On *Robinia Pseudacacia*, Singleton, *B.E.C.*, 894, 1925.
*Thesium humifusum DC. Established. Barry Docks!, etc., *B.E.C.*, 368, 1930.

Euphorbia platyphyllos L. Agrestal. Very rare. Llandough, etc., *Fl. Glam.*, 140.

(E. stricta L. Penarth, Fl. J.S., 75).

E. Helioscopia L. Agrestal. Common!

E. Amygdaloides L. Sylvestral. Common!

*E. virgata W. & K. Adventive. Established. Barry Docks!, etc.

*E. Esula L., var. pinifolia (Lam.) Dr. Adventive. Cardiff Docks (as type, *J.B. Supp.*, 86. 1907).

*E. Cyparissias L. Adventive. Aberavon, *B.E.C.*, 398, etc., 1918.

E. Paralias L. Littoral. Locally common. Kenfig, etc.

E. portlandica L. Littoral. Locally common. Kenfig, etc.

E. Peplus L. Agrestal. Common!

E. exigua L. Agrestal. Common. Also on cliffs!

E. Lathyris L. Sylvestral. Nicholaston Woods!, *B.E.C.*, 127, 1917.

E. Peplis L. Littoral. Porthcawl, etc., extinct ?, L.W.D. Mat., 32, etc.

*Buxus sempervirens L. Sylvestral. Frequent. Not native!

Mercurialis perennis L. Sylvestral. Common!

*M. annua L. Agrestal. Locally common. Cardiff, etc.!

b. ambigua (L.). Port Talbot Docks, *J.B. Supp.*, 86, 1907.

Ulmus montana Stokes. Sylvestral. Common. Native in uplands!

U. Plotii Dr. Septal. Very rare. Sketty, *B.E.C.*, 746, 1922.

*U. sativa Mill. Septal. Probably always planted!

*U. minor Mill. Planted. Self sown seedlings occur!

Humulus Lupulus L. Septal. Locally common. Llandaff, etc.!

*Cannabis sativa L. Casual. Waste places!

*Ficus Carica L. Established on cliffs at Mumbles, etc.!, *B.E.C.*, 417, 1927.

Urtica dioica L. Viatical. Locally common. Sand burrows, etc.!

b. angustifolia Wimm. & Grab. Laleston, *J.B. Supp.*, 56, 1907.

U. urens L. Viatical. Common!

*U. pilulifera L. Casual. Cardiff, Penarth, Fl. J.S., 76.

Parietaria ramiflora Moench. Rupestral. Common!

b. simplex (Bach.). Cardiff, etc., *J.B. Supp.*, 56, 1907.

Myrica Gale L. Uliginal. Cefn Bryn, *Fl. Glam.*, 142, etc.

Betula alba L. Sylvestral. Common!

b. pendula Ait. Often planted!

B. pubescens Ehrh. Sylvestral. Locally common, in uplands!

Alnus rotundifolia Mill. Sylvestral. Common. River and stream sides, etc.!

Carpinus Betulus L. Sylvestral. Scarce. Possibly native in limestone woods!

Corylus Avellana L. Sylvestral. Common!

Quercus Robur L. Sylvestral. Locally common!

Q. sessiliflora Salisb. Sylvestral. Locally common. Oxwich, etc., *J.B. Supp.*, 57, 1907.

*Q. Cerris L. Sylvestral. Aberdulais, Gutch, etc.!

*Q. Ilex L. Naturalised. Seedlings on Caswell cliffs!, *B.E.C.*, 397, etc., 1921.

*Castanea sativa Mill. Naturalised banks of River Taff, etc.!

*Juglans regia L. Limestone cliff, Widegate, *B.E.C.*, 895, 1925.

Fagus sylvatica L. Sylvestral, native. Scarce. Near Rudry, etc.!

*Salix pentandra L. Aberdare, etc., native?, *J.B. Supp.*, 86, 1907.

S. fragilis L. Septal, etc. Locally common. River Taff, etc.!, teste J. Fraser.

b. decipiens (Hoffm.). Aberdare, *J.B. Supp.*, 56, 1907.

(c. britannica F. B. White. "Frequent," *J.B. Supp.*, 57, 1907).

S. alba L. Septal, etc. Locally common. Ponteanna, etc.!, teste J. Fraser.

b. vitellina (L.). Swansea, Gutch, etc.

c. stenophylla Fraser. Banks of River Taff, Cardiff, teste J. Fraser.

× fragilis = viridis Fr. Scarce. River Taff, Cardiff!, teste J. Fraser.

S. triandra L. Near Pyle, *J.B.*, 250, 1902.

b. Hoffmanniana (Sm.). Kenfig Pool, Hb. Motley, etc.

c. amygdalina (L.) Bab. Near Rumney at Llwynygrant, A. A. Pettigrew.

S. purpurea L., var. helix Sm. Rare. Penylan Brook!, etc., teste J. Fraser.

× viminalis = rubra Huds. Leckwith Wood, etc., *J.B.*, 57, 1907.

S. viminalis L. River sides, etc. Common!

[×] stipularis (Sm.). Crumlin Burrows, *J.B.*, 376, 1886.

b. linearifolia Wimm. & Gr. Cardiff!, teste J. Fraser.

× Smithiana Willd. Cowbridge, etc., *J.B. Supp.*, 57, 1907.

S. caprea L. Septal, Sylvestral. Common! Several forms, teste J. Fraser.

S. aurita L. Scarce in Vale of Glamorgan, less so in hilly districts!

S. atrocinerea Brot. Septal. Common!

S. repens L. Ericetal, etc. Common!

b. argentea (Sm.). Kenfig Burrows!

c. ascendens (Sm.). Crumlin Burrows, Dillwyn, L.W.D. Mat.

d. fusca (L.). Scarce. Swansea, W. R. Linton, *B.E.C.*, 133, 1926.

e. incubacea (L.). Aberdare, *J.B. Supp.*, 57, 1907.

f. parviflora (Sm.). Swansea, *B.E.C.*, 1892.

g. prostrata (Sm.). Swansea, *B.E.C.*, 1886.

*S. Andersoniana Sm. Aberdare, planted?, *J.B. Supp.*, 86, etc., 1907.

*Populus canescens Sm. Frequently planted!

P. tremula L. Sylvestral. Scarce. Sant-y-nil, etc.!

*P. nigra L. Occasionally planted.

*P. Deltoides Marsh. × nigra = serotina (Hartig). Often planted!

*P. Tacamahacca Mill. Self-sown ? on Kenfig Dunes!

*P. alba. Occasionally planted!

Empetrum nigrum L. Ericetal. Hills between Aberdare & Merthyr; *J.B. Supp.*, 57, etc., 1907.

Ceratophyllum demersum L. Lacustral. Hensol!, *B.E.C.*, 133, 1926. Accidentally introduced?

Hydrocharis Morsus-ranae L. Margam Marshes, *J.B.*, 299, etc., 1903.

*Elodea canadensis Michx. Lacustral. Locally common!

Liparis Loeselii Rich., b. ovata Riddels. Uliginal. Rare. Kenfig!, etc., *B.E.C.*, 418, 1927.

Neottia Nidus-avis (L.) Rich. Sylvestral. Rare. Cwrt-yr-ala, etc.!

Listera ovata (L.) Br. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

Spiranthes spiralis (L.) C. Koch. Pascual. Locally common. The Leys, etc.!

Helleborine palustris (Mill.) Schrank. Uliginal. Locally common. Ystradowen!, etc.

f. floribis albis. Kenfig. *B.E.C.*, 418, 1927.

b. ericetorum (A. & G.). Whitford Point, *B.E.C.*, 128, 1917.

H. latifolia Dr. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

(H. atropurpurea (Rafn.). Near Cardiff, *B.E.C.*, 669, 1931. Error).

Orchis Morio L. Pascual. Locally common. Pwll-y-pant, etc.!

O. incarnata L. Paludal. Scarce. Cog Rises, *Fl. Glam.*, 149.

b. dunensis Dr. Kenfig!, *B.E.C.*, 419, 1927.

O. praetermissa Dr. Paludal. Locally common. Kenfig, etc.!

O. purpurella Steph. Llangennith, *B.E.C.*, 399, 1921, ?.

O. maculata L. Ericetal. Locally common. Rhiwbina, etc.!, *B.E.C.*, 669, 1931.

b. macroglossa Dr. Cardiff!, *B.E.C.*, 669, 1931.

O. Fuchsii Dr. Sylvestral. Locally common. Dunraven, etc.!, sp. Hb. Vachell, teste Dr Druce.

O. mascula L. Sylvestral, etc. Common!

O. pyramidalis L. Pascual. Scarce. Monknash, etc.!

Ophrys apifera Huds. Pascual. Scarce. Llansannor, etc.!

O. muscifera Huds. Sylvestral. St Nicholas, 1883 ?, Fl. J.S., 82.

(Herminium Monorchis (L.) Br. Beaupre, *C.N.S. Procs.*, 1882).

Habenaria Gymnadenia Dr. Glareal, Uliginal. Scarce. Kenfig, etc.!

*H. albida (L.) Br. Pascual. Cwmdu Fall, Swansea Valley, *B.E.C.*, 749, etc.!, 1922.

H. viridis (L.) Br. Pratal, Uliginal. Rare. St Brides Major!, etc.

b. Vaillantii (Ten.) Fern. Rhossili. *J.B. Supp.*, 59, 1907.

Platanthera virescens (Zollik) Dr. Sylvestral. Scarce. Rhiwbina!, teste P. M. Hall.

P. bifolia (L.) Br. Sylvestral. Gower, etc., *J.B.*, 312, 1904.

Iris Pseudacorus L. Paludal. Common!

b. acoriformis (Bor.) Baker. Oxwich Marsh!, teste Dr Druce.

c. pallidiflava Sims. Parkmill, *B.E.C.*, 681, 1919.

I. foetidissima L. Sylvestral. Locally common. Shrubby places near coast!

*Crocus vernus (L.). Established. Fairy Hill, etc!, *B.E.C.*, 598, 1924.

*C. biflorus Mill. Penrice Green, *B.E.C.*, 216, 1923.

*Sisyrinchium angustifolium Mill. Pratal. Whitchurch, introduced with crops!

*Tritonia crocosmiflora Nich. Blackpill, *B.E.C.*, 400, 1921.

Narcissus Pseudo-Narcissus L. Sylvestral, etc. Locally common. Pencoed, etc.!

*N. major Curtis. Scarce. Established. Penylan, etc.! (*B.E.C.*, 216, 1923).

*N. biflorus Curtis. Pratal. Established. Kenfig!, *B.E.C.*, 420, etc., 1927.

*N. poeticus L. In a wood near Pwllypant!, etc.

*N. incomparabilis Mill. Established by River Taff, Ponteanna!

Galanthus nivalis L. Sylvestral. Scarce. Stream sides, Draethen, etc.!

*Leucojum vernum L. Established. Caswell, *B.E.C.*, 898, 1925.

*L. aestivum L. Paludal. Kenfig, Hb. Motley, etc.

Tamus communis L. Septal. Common!

Ruscus aculeatus L. Native and locally common. In woods and on cliffs, Gower, etc.!

Asparagus maritimus Mill. Littoral. Rare. Gower!, etc.

*A. officinalis L. Established. Oxwich Bay, etc.

Polygonatum multiflorum (L.) All. Sylvestral. Rare. Castell Coch, etc.!

Convallaria majalis L. Sylvestral. Very rare. Little Garth, 1910. Extinct ?, etc.

*Yucca gloriosa L. Am. Glamorgan, *British Plant List*, Edition 2.

*Allium Ampeloprasum L., b. holmense Mill. Flat Holm, Hb. Brit. Mus.

A. vineale L. Pascual. Locally common!
  b. bulbiferum Syme. Porthcawl, etc., *J.B. Supp.*, 60, 1907.
  c. compactum (Thuill.). Cogan!, etc.

A. ursinum L. Sylvestral. Common!

A. oleraceum L. Pratal. Llanishen!, etc.

*A. Schoenoprasum L. Adventive ? Aberdare, etc.!

* A. roseum L. Adventive. Marcross, sp. Hb. Vachell!

Scilla verna Huds. Pascual, local. Porthcawl, etc.!

S. autumnalis L. (Glareal. Marcross, *Fl. Glam.*, 154, etc.). Adventive ? Barry, *B.E.C.*, 217, 1923.

S. non-scripta (L.) H. & L. Sylvestral. Common!

*S. hispanica Mill. Oxwich Dunes, *B.E.C.*, 898, 1925.

*(Ornithogalum pyrenaicum L. Porthkerry Woods, Fl. J.S., 83).

O. umbellatum L. Pascual. Merthyr Mawr!, etc.

(Gagea lutea (L.) Ker-Gawler. Castell Coch Woods, 1843, extinct, Fl. J.S., 83).

Colchicum autumnale L. Pratal. Rare. Newton!, *J.B.*, 317, etc., 1902.

Narthecium ossifragum (L.) Huds. Uliginal. Locally common. Ystradowen, etc.!

Paris quadrifolia L. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

Juncus spinosus Forsk. Littoral. Locally common. The Leys, etc.!

J. acutus L. Littoral, local. Kenfig Burrows, etc.!

J. CONGLOMERATUS L. Paludal. Common. Sant-y-nil, etc.!

J. EFFUSUS L. Paludal. Common. Sant-y-nil, etc.!

b. COMPACTUS Lej. & Court. Pengam Moors!

J. INFLEXUS L. Paludal. Common. Sully Moors, etc.!

J. SUBNODULOSUS Schrank. Paludal. Locally common. Kenfig Burrows, etc.!

J. ACUTIFLORUS Ehrh. Sylvestral, Paludal. Common!

b. MULTIFLORUS (Weihe) Dr. Craig-y-llyn, *J.B. Supp.*, 61, 1907.

J. ARTICULATUS L. Paludal. Locally common. Hirwaun!, etc.

(J. ALPINUS Villars. Glamorgan, *T.B. Supp.*, sp. Hb. A. Bennett. Error).

J. BULBOSUS L. Paludal. Common!

b. KOCHII (F. Schultz) Dr. Fairwood Common, *J.B.*, 61, 1886.

J. SQUARROSUS L. Ericetal. Common. On heathy moorlands!

(J. COMPRESSUS Jacq. Glamorgan, *T.B. Supp.* 11. Error?, record probably erroneous).

J. GERARDI Lois. Littoral. Common along coast!

*J. TENUIS Willd. Adventive. Taffs Well, etc., *J.B. Supp.*, 87, 1907.

J. BUFONIUS L. Paludal. Common!

b. FASCICULARIS Koch. Porthcawl, etc., *J.B. Supp.*, 60, 1907.

LUZULA SYLVATICA (Huds.) Gaud. Sylvestral. Locally common. Penllergaer, etc.!

L. PILOSA (L.) Willd. Sylvestral. Locally common. Draethen, etc.!

b. [? ×] BORRERI (Bromf.). Lisvano, *fide* A. Bennett?, *J.B. Supp.*, 61, 1907.

[L. FORSTERI (Sm.) DC. Several references, including *Comital Flora*, all doubtful].

L. MULTIFLORA (Retz.) DC. Ericetal. Locally common. Pendoylan, etc.!

b. CONGESTA (DC.). Aberdare, etc., *J.B. Supp.*, 61, 1907.

L. CAMPESTRIS (L.) DC. Pascual. Common!

*PHOENIX DACTYLIFERA L. (Seedlings). Frequently introduced with town refuse!

TYPHA LATIFOLIA L. Paludal. Locally common!

T. ANGUSTIFOLIA L. Paludal. Rare. Oxwich Marsh, etc.!

SPARGANIUM NEGLECTUM Beeby. Paludal. Locally common. Cadoxton Moors, etc.!

S. RAMOSUM Huds. Paludal. Common. Cadoxton Moors, etc.!

b. MICROCARPUM (Neum.). Flemingstone Moor, *J.B.*, 409, 1909.

S. SIMPLEX Huds. Lacustral. Locally common!

b. LONGISSIMUM Fr. Crumlin Bog, *J.B. Supp.*, 62, 1907.

S. ANGUSTIFOLIUM Michx. Lacustral. Rare. Llyn Fach, etc.!

S. MINIMUM Fries. Lacustral. Singleton Marsh, Gutch, etc. (?).

ARUM MACULATUM L. Septal. Common!

*ACORUS CALAMUS L. Briton Ferry, Flower, etc.

LEMNA MINOR L. Lacustral. Common. Sker, etc.!

L. POLYRRHIZA L. Lacustral. Rare. Sker, etc.!

L. TRISULCA L. Lacustral. Locally common. Pengam, etc.!

L. GIBBA L. Lacustral. Scarce. Aberdare Valley, *J.B. Supp.*, 62, etc., 1907.

WOLFFIA ARRHIZA (L.) Wimm. Lacustral. Rare. Ponds, Penarth Road, Cardiff (*Fl. Glam.* 160, 1899).

ALISMA PLANTAGO-AQUATICA L. Paludal. Common!

ECHINODORUS RANUNCULOIDES (L.) Engelm. Paludal. Locally common. Kenfig, etc.!

ELISMA NATANS (L.) Buch. Crumlin Bog; Singleton, Gutch. *Phyt.*, 180, 1842.

SAGITTARIA SAGITTIFOLIA L. Lacustral. Rare. Near Cardiff, etc.!

BUTOMUS UMBELLATUS L. Paludal. Locally common. Gower, etc.!

TRIGLOCHIN MARITIMA L. Littoral. Locally common. In salt marshes!

T. PALUSTRIS L. Paludal. Locally common. Llanishen, etc.!

POTAMOGETON NATANS L. Lacustral. Common. Llansannor, etc.!

P. OBLONGUS Viv. Lacustral. Common. Caerphilly, etc.!

(P. COLORATUS Hornem. East Moors, etc., Fl. J.S., 86).

(P. ALPINUS Balb. Cardiff, etc., Fl. J.S., 86).

P. GRAMINEUS L. Lacustral. Rare. Kenfig Burrows!, etc., teste W. H. Pearsall.

P. VARIANS Fryer. Lacustral. Glamorgan, *T.B. Supp.*, sp. Armitage.

P. LUCENS L. Lacustral. Rare. Kenfig Pool!, teste W. H. Pearsall.

(P. PRAELONGUS Wulfen. River Ely near St George's, etc., Fl. J.S., 86).

P. PERFOLIATUS L. Lacustral. Scarce. Kenfig Pool, etc.!, teste A. Bennett.

b. OBLONGIFOLIUS M. & K. Canal at Cardiff!, teste A. Bennett.

P. CRISPUS L. Lacustral. Locally common. Roath Lake, etc.!

P. OBTUSIFOLIUS M. & K. Lacustral. Rare. Mynydd-y-glew!, *B.E.C.*, 506, 1916.

P. FRIESII Rupr. Rare. Canal near Cardiff!, teste W. H. Pearsall.

P. PUSILLUS L. Lacustral. Locally common. Canal near Cardiff, etc.!, teste W. H. Pearsall.

b. TENUISSIMUS M. & K. Kenfig Pool!, teste W. H. Pearsall.

P. PECTINATUS L. Lacustral. Locally common. Kenfig Pool, etc.!, teste W. H. Pearsall.

b. DIFFUSUS (Hagstr.). Near Merthyr!, teste W. H. Pearsall.

f. LONGIPEDUNCULATUS Tisel. Kenfig Pool!, teste W. H. Pearsall.

P. INTERRUPTUS Kit. Lacustral. Canal, Neath, *B.E.C.*, 900, etc., 1925.

b. SCOPARIUS Fryer. Oxwich, etc., *J.B. Supp.*, 63, 1907.

P. DENSUS L. Lacustral. Locally common. Dunraven, etc.!

RUPPIA MARITIMA L. Swansea, Hb. Geldart, *fide* H.J.R., *J.B. Supp.*, 63, 1907.

R. ROSTELLATA Koch. Littoral. Scarce. The Leys!, etc.

ZANNICHELLIA PALUSTRIS L. Lacustral. Scarce. Near Aberdare, etc.!

Z. MARITIMA Nolte. Littoral, Lacustral. Locally common. Salt marshes!

Z. GIBBEROSA Reichb. Welsh St Donats, *J.B.*, 113, 1920.

ZOSTERA MARINA L. Littoral. Locally common. Oxwich Bay!, etc.
b. ANGUSTIFOLIA Hornem. Oxwich Bay, Prof. McLean.

Z. NANA Roth. Littoral. Llanmorlais mud flats, *B.E.C.*, 404, 1918.

*CYPERUS LONGUS L. Margam Lake, probably planted, *B.E.C.*, 900, etc., 1925.

ELEOCHARIS PALUSTRIS (L.) Br. Paludal. Common!

E. UNIGLUMIS Schultes. Paludal. Rare. Llanmadoc, sp. Hb. Vachell. C. I. and N. Y. Sandwith, 1933.

E. MULTICAULIS Sm. Paludal. Locally common. Mynydd-y-glew, etc.!

(E. ACICULARIS (L.) Br. Graigafan, Hb. Motley, etc.).

SCIRPUS SYLVATICUS L. Paludal. Scarce. St Fagans, etc.!

S. MARITIMUS L. Littoral. Locally common!
b. COMPACTUS Hoffm. Gileston!
c. MONOSTACHYS Meyer. Oxwich, etc., *B.E.C.*, 375, 1930.

S. LACUSTRIS L. Lacustral. Locally common. Aberthaw, etc.!

S. TABERNAEMONTANI Gmel. Lacustral. Locally common. Oxwich, etc.!

S. CAESPITOSUS L. Ericetal. Locally common. Talygarn, etc.!

S. PAUCIFLORUS Lightf. Locally common. Bogs and moorlands!

S. HOLOSCHOENUS L. Littoral. Rare. East Moors, extinct; Barry!, *B.E.C.*, 375, 1930.

S. SETACEUS L. Paludal. Common. Gower, etc.!

S. FILIFORMIS Savi. Paludal. Locally common, mostly if not entirely the following variety.
b. MONOSTACHYS Clarke & Marshall. Penard, etc.!, teste A. Bennett.

S. FLUITANS L. Lacustral. Locally common. Gower, etc.!

S. RUFUS (Huds.) Schrad. Littoral. Very rare. Llanmadoc!, sp. Hb. Vachell, teste A. Bennett.

ERIOPHORUM PANICULATUM (Lam.) Dr. Uliginal. Rare. Cefn Bryn, etc., *Fl. Glam.*, 166.

E. ANGUSTIFOLIUM Roth. Uliginal. Common!
b. LONGIFOLIUM Roth. Fairwood Common. *J.B. Supp.*, 64, 1907.

E. VAGINATUM L. Uliginal. Locally common!

RYNCHOSPORA FUSCA (L.) Ait. Uliginal. Crumlin Bog, *J.B.*, 296, 1913.

R. ALBA (L.) Vahl. Uliginal. Rare. Cefn Bryn!

SCHOENUS NIGRICANS L. Uliginal. Crumlin Bog, *Phyt.*, 780, 1844.

CLADIUM MARISCUS (Br.). Paludal. Crumlin Bog, Moggridge sp., *T.B.*

CAREX PSEUDO-CYPERUS L. Paludal. Rare. Sant-y-nil, etc.!

C. RIPARIA Curtis. Paludal. Common. Sant-y-nil, etc.!

C. ACUTIFORMIS Ehrh. Paludal. Locally common. Lavernock, etc.!
b. SPADICEA (Roth). Sant-y-nil!, etc., *B.E.C.*, 591, 1916.

C. VESICARIA L. Paludal. Locally common. Mynydd-y-glew!, etc., *B.E.C.*, 421, 1927.

C. INFLATA Huds. Paludal. Locally common. Mynydd-y-glew, etc.!
b. INVOLUTA (Bab.). Mynydd-y-glew, *B.E.C.*, 421, 1927.
c. ROBUSTA (Sond.) Dr. Llancaiach, *J.B.*, 410, 1909.

C. HIRTA L. Paludal. Common!
  b. HIRTIFORMIS Pers. Sant-y-nil, etc.!
C. PENDULA Huds. Sylvestral. Locally common. Leckwith, etc.!
C. SYLVATICA Huds. Sylvestral. Common!
C. STRIGOSA Huds. Sylvestral. Rare. Cwrt-yr-ala!, etc.
C. HELODES Link. Paludal. Locally common. Mynydd-y-glew!, etc.
C. BINERVIS Sm. Ericetal. Common on upland moors!
C. DISTANS L. Littoral, etc. Locally common. Near Cogan, etc.!
C. FULVA Host. Paludal. Scarce. Mynydd-y-glew, etc.!
C. FLAVA L. Paludal. Common!
  b. OEDOCARPA And. Ystradowen!, etc.
C. LEPIDOCARPA Tausch. Paludal. Rare. Ystradowen!
C. OEDERI Retz. Paludal. Locally common. Kenfig Burrows, etc.!
  b. CYPEROIDES Marss. Oxwich, *J.B.*, 410, 1909.
  c. ELATIOR Anderson. Whitchurch, *J.B.*, 410, 1909.
C. EXTENSA Good. Littoral. Locally common. Gower!, etc., *B.E.C.*, 421, 1927.
C. CARYOPHYLLEA Latour. Pascual. Common!
C. MONTANA L. Ericetal. Rare. On limestone. Ewenny Downs, etc.!
C. PILULIFERA L. Ericetal. Locally common. Mynydd-y-glew, etc.!
C. DIVERSICOLOR Crantz. Pascual. Common!
C. PALLESCENS L. Sylvestral. Scarce. Mynydd-y-glew!, etc.
C. PANICEA L. Uliginal. Common. Mynydd-y-glew, etc.!
C. LIMOSA L. Uliginal. Rare. Crumlin Bog, Hb. Brit. Mus., etc.
C. ELATA All. Paludal. Rare. Kenfig Pool, L.W.D. Mat., 29, etc.
C. GRACILIS Curt. Paludal. Scarce. Near Ely, *J.B.*, 410, 1909.
  b. GRACILESCENS Almq. Ewenny River!
  c. PROLIXA Fr.? Fairwater, *B.E.C.*, 592, 1916.
C. GOODENOWII Gay. Paludal. Common!
  b. CHLOROSTACHYA (Reichb.) Asch. Blackpill, *B.E.C.*, 406, 1918.
  c. JUNCEA (Fr.) Asch. Merthyr Tydfil!, sp. Hb. Vachell, teste A. Bennett.
  d. MELAENA Wimm. Merthyr Tydfil!, sp. Hb. Vachell, teste A. Bennett.
  e. RECTA (Fleisch.) A. & G. Port Talbot, *B.E.C.*, 28, 1903.
C. LEPORINA L. Ericetal. Common. Ystradowen, etc.!
C. STELLULATA Good. Uliginal. Common. Mynydd-y-glew, etc.!
C. REMOTA L. Sylvestral. Common. Cwrt-yr-ala, etc.!
  × VULPINA = AXILLARIS Good. Rare. Swanbridge!, sp. Hb. Vachell, teste A. Bennett.
C. CANESCENS L. Uliginal. Rare. Mynydd-y-glew!, etc., *B.E.C.*, 422, 1927.
C. VULPINA L. Paludal. Common!
C. MURICATA L. Septal, etc. Locally common. Sant-y-nil, etc.!
C. PAIRAEI F. Schultz. Septal. Scarce. Llandaff!, etc.
  b. LEERSII (F. Schultz). Flat Holm!, teste A. J. Wilmott, etc.
C. DIVULSA Stokes. Septal. Locally common. Pendoylan, etc.

C. paniculata L. Uliginal. Locally common. Ystradowen Bog, etc.!

×remota = Boenninghauseniana Weihe. Rare. Moors near Cwmparc, *Fl. Glam.*, p. 168.

C. diandra Schrank. Uliginal. Sketty Bog, Hb. Brit. Mus.

C. disticha Huds. Paludal. Scarce. Ystradowen!, etc.

C. arenaria L. Littoral. Locally common. Sand hills along coast!

C. pulicaris L. Ericetal. Common. Pendoylan, etc.!

C. dioica L. Uliginal. Rare. Near Aberdulais Waterfall, L.W.D. Mat., 29, etc.

*Panicum miliaceum L. Casual. Splott!, etc.

*P. Crus-galli L. Viatical. About Cardiff, etc.!

b. longisetum Döll. Cardiff!

*P. sanguinale L. Viatical. Persisting, Cardiff!

*P. Ischaemum Schreb. Casual. Cardiff, etc., Fl. J.S., 93.

*Setaria viridis (L.) Beauv. Viatical. Locally common. Waste ground, Cardiff, etc.!

*S. glauca Beauv. Casual. Splott, etc.!

*S. verticillata (L.) Beauv., b. brevisetum Godr. Casual. Splott, etc.!

*Spartina Townsendii H. & J. Groves. Introduced, 1921. Mouth, River Kenfig!

*Phalaris minor Retz. Casual. Splott, etc.!, *B.E.C.*, 220, 1923.

*P. canariensis L. Viatical. Waste ground about Cardiff, etc.!

*P. paradoxa L. Casual. Splott!, etc.

P. arundinacea L. Paludal. Locally common. Llandaff, etc.!

Anthoxanthum odoratum L. Pratal, etc. Common!

b. villosum Lois. Mynydd-y-glew!

*A. Puelii Lec. & Lam. Casual. Barry!, *B.E.C.*, 422, 1927.

Alopecurus pratensis L. Pratal. Common!

A. myosuroides Huds. Agrestal. About Cardiff, etc.!

A. bulbosus Gouan. Littoral. Locally common. Porthkerry, etc.!

A. geniculatus L. Paludal. Common!

(A. aequalis Sobol. Paludal. Grangetown, etc., Fl. J.S., 94).

*Piptatherum multiflorum (Desf.) Beauv. Casual. Barry Dock!, *B.E.C.*, 457, 1924.

Milium effusum L. Sylvestral. Locally common. Margam, etc.!

Phleum pratense L. Pratal, etc.

b. stoloniferum Bab. Port Eynon, *J.B.*, 410, 1909.

c. nodosum L. Port Eynon, *J.B. Supp.*, 66, 1907.

d. praecox (Jord.). Penylan!

*[P. phleoides (L.) Simonk. "Ballast, Cardiff," Fl. J.S., 94].

P. arenarium L. Littoral, Glareal. Locally common. Sand dunes!

*Agrostis verticillata Vill. Adventive. Barry Dock!, *B.E.C.*, 602, 1924.

A. alba L. Pratal, etc. Common!

b. major Gaud. Port Talbot, *J.B. Supp.*, 67, 1907.

c. maritima Meyer. Oxwich, etc., *J.B. Supp.*, 67, 1907.

d. stolonifera (L.). Barry Island!

e. sylvatica (Host) non Poll. Port Talbot. *J.B. Supp.*, 67, 1907.

f. condensata Hack. Oxwich Bay, etc.. *J.B. Supp.*, 67, 1907.

A. capillaris L. Glareal, etc. Common!

b. pumila (L.) Dr. Frequent. *J.B. Supp.*, 67, 1907.

c. nigra (With.). Splott!

A. setacea Curt. Ericetal, local. Mynydd-y-glew, etc.!

A. canina L. Ericetal, etc. Scarce. Mynydd-y-glew!, etc.

b. mutica Gaud. Llandough-juxta-Cowbridge, *J.B. Supp.*, 67, 1907.

*Polypogon monspeliensis (L.) Desf. Littoral. Cardiff!, *B.E.C.*, 602, 1924.

P. lutosus (Poiret) Hitchcock. Littoral. Cardiff!, *B.E.C.*, 602, 1924.

Calamagrostis epigeios (L.) Roth. Sylvestral. Locally common. Penylan, etc.!

(C. Calamagrostis (L.) Dr. Swansea, Gutch. Probably error).

Gastridium ventricosum (Gouan) S. & T. Native on limestone cliffs; rare, Cwm Nash, etc.!, *B.E.C.*, 765, 1928, and *B.E.C.*, 602, 1924.

*Apera Spica-venti (L.) Beauv. Casual. Grangetown!, etc.

*A. interrupta (L.) Reichb. Casual. Cardiff Docks, etc., Fl. J.S., 96, etc.

Ammophila arenaria (L.) Link. Littoral. Locally common. Sand dunes!

*Lagurus ovatus L. Casual. Splott, etc.!

Aira caryophyllea L. Glareal. Locally common. Marcross, etc.!

A. praecox L. Glareal. Garth Mountain, etc.!

Weingaertneria canescens (L.) Bernh. Littoral. Port Talbot. *J.B. Supp.*, 67, 1907.

Deschampsia caespitosa (L.) Beauv. Pratal. Common!

b. brevifolia (Parn.) Dr. Ystalyfera, etc., *J.B. Supp.*, 67. 1907.

c. parviflora (Thuill.) Dum. Llandough!

D. flexuosa (L.) Trin. Ericetal. Common. On heaths!

Holcus mollis L. Sylvestral. Locally common. Pwllypant, etc.!

H. lanatus L. Pratal. Common!

Trisetum flavescens (L.) Beauv. Pascual. Common!

*Avena fatua L. Agrestal, Viatical. Scarce. Barry Docks!, etc.

b. pilosa Syme. Cardiff!, *B.E.C.*, 221, 1923.

c. glabrata (Peterm.). Cardiff. *B.E.C.*, 602, 1924.

d. pilosissima S. F. Gray. Graigafan, Hb. Motley.

A. pubescens Huds. Pascual. Locally common. Barry Island, etc.!

A. pratensis L. Pascual. Rare. Porthkerry, etc., *J.B. Supp.*, 67, 1907.

*A. strigosa Schreb., b. orcadensis (Marq.). Casual. Cardiff!

*A. sativa L. Casual. Cardiff!, *B.E.C.*, 221, 1923.

Arrhenatherum elatius (L.) Mert. & Koch. Septal. Common!

A. tuberosum (Gilib.) Dr. Agrestal. Pendoylan!, *B.E.C.*, 423, etc., 1927.

*Cynodon Dactylon (L.) Pers. Glareal. Established. Banks of River Taff, etc.!

SIEGLINGIA DECUMBENS (L.) Bernh. Pascual. Locally common. Moors, etc.

PHRAGMITES COMMUNIS Trin. Paludal. Common!

*CYNOSURUS ECHINATUS L. Viatical. Scarce. About Cardiff, etc.!

C. CRISTATUS L. Pascual. Common!

KOELERIA GRACILIS Pers. Pascual. Scarce. Gileston, etc.! (*B.E.C.*, 689, 1919).

K. BRITANNICA (Domin). Porthkerry!, sp. Hb. Vachell, teste W. O. Howarth (*B.E.C.*, 40, 1932).

MOLINIA CAERULEA (L.) Moench. Ericetal. Locally common. Moors and marshes!

(CATABROSA AQUATICA (L.) Beauv. Pengam Moors, etc., extinct, Fl. J.S., 98).

MELICA NUTANS L. Sylvestral. Very rare. Morlais Castle!, *B.E.C.*, 115, 1932.

M. UNIFLORA Retz. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

DACTYLIS GLOMERATA L. Pascual, etc. Common!

b. ABBREVIATA Drej. Oxwich, etc., *J.B. Supp.*, 68, 1907.

DESMAZERIA LOLIACEA (Huds.) Nym. Littoral. Locally common. Penard, etc.!

BRIZA MEDIA L. Pratal. Common!

*B. MINOR L. Casual. Splott, *B.E.C.*, 182, 1926.

*B. MAXIMA L. Casual. Radyr, etc., *B.E.C.*, 1026, 1925.

*POA CHAIXII Vill. Casual. Aberdare, *J.B. Supp.*, 88, 1907.

P. PRATENSIS L. Pascual. Common!

b. ANGUSTIFOLIA (L.). Hirwaun, etc., *J.B.*, 410, 1909.

P. SUBCAERULEA Sm. Glareal, etc. Locally common. Monknash, etc.!

*P. PALUSTRIS L. Casual. Splott!, etc., *B.E.C.*, 905, 1925.

P. TRIVIALIS L. Pratal, etc. Common!

b. GLABRA Döll. Whitford Burrows, *J.B.*, 410, 1909.

c. PARVIFLORA Parn. Aberdare, *J.B. Supp.*, 68, 1907.

P. NEMORALIS L. Sylvestral. Locally common. Llandaff, etc.!

b. COARCTATA Gaud. Penarth, *Fl. Glam.*, 179.

P. COMPRESSA L. Rupestral. Scarce. Barry, etc.!

b. POLYNODA (Parn.). Oxwich, etc., *J.B. Supp.*, 68, 1907.

P. BULBOSA L., b. VIVIPARA. Littoral. Very rare. Cold Knap!

P. ANNUA L. Agrestal, etc. Common!

b. REPTANS Haussk. Cold Knap., *B.E.C.*, 185, 1912.

GLYCERIA AQUATICA (L.) Wahl. Paludal. Locally common. East Aberthaw, etc.

G. FLUITANS (L.) Br. Paludal. Locally common. Leckwith Moors, etc.!

b. TRITICEA (Fr.) M. T. Lange. Reynoldstone, *J.B.*, 411, 1909.

G. PLICATA Fr. Paludal. Locally common. Whitchurch, etc.!

b. DECLINATA (Bréb.). Rhigos Mountain!, sp. Hb. Vachell, teste Dr Druce.

G. DISTANS (L.) Wahl. Littoral. Locally common. Pengam Marsh, etc.!

G. MARITIMA (L.) Mert. & Koch. Littoral. Locally common. East Aberthaw, etc.!

G. BORRERI Bab. Littoral. Cardiff Dock, *B.E.C.*, 378, 1930.

G. PROCUMBENS Dum. Littoral. Locally common. Pengam Marshes, etc.!

b. ERECTA Dr. Cardiff Docks. *B.E.C.*, 322, 1927.

FESTUCA RIGIDA (L.) Kunth. Glareal. Locally common. Penard, etc.!

F. GIGANTEA (L.) Vill. Sylvestral. Locally common. St Nicholas, etc.!

F. ARUNDINACEA Schreb. Pratal, etc. Locally common. Lias cliffs, etc.!, sp. Hb. Vachell, teste W. O. Howarth.

F. ELATIOR L., sub-sp., a. PRATENSIS Huds. Pratal. Common.

b. PSEUDO-LOLIACEA (Hack.). Aberdare, etc., *J.B.*, 70, 1906.

F. SYLVATICA Vill. Sylvestral. Rare. Eynon Gam and Gwladys Falls, *B.E.C.*, 905, 1925.

F. RUBRA L. Pratal, etc. Common! (*Journ. Linn. Soc.*, 317, 1924.)

b. COMMUTATA Gaud. Taffs Well, etc.!, sp. Hb. Vachell, teste W. O. Howarth.

c. BARBATA (Hack.). Swansea, etc., H.J.R., teste W. O. Howarth.

d. MEGASTACHYA Gaud. Cliffs near Penarth! (*Journ. Linn. Soc.*, 317, 1924.)

e. PRUINOSA (Hack.). Sully Island, *B.E.C.*, 906, 1925.

f. ARENARIA (Osb.) Fr. Llantwit Major, *B.E.C.*, 905, 1925.

g. TENUIFOLIA Howarth. Tidal mud by River Ely!, sp. Hb. Vachell, teste W. O. Howarth.

F. OVINA L., var. GENUIANA. Pascual. Common! (*Journ. Linn. Soc.*, 32, 1925.)

b. HISPIDULA Hack. Llyn Fawr, *B.E.C.*, 906, 1925.

F. CAPILLATA Lam. Penard!, sp. Hb. Vachell, teste W. O. Howarth. (*Journ. Linn. Soc.*, 30, 1925.)

F. MEMBRANACEA (L.) Dr. Littoral. Locally common. Sand dunes, Kenfig, etc.!

*F. DANTHONII A. & G., b. AMBIGUA (Le Gall.). Casual. Cardiff, *B.E.C.*, 603, 1924.

F. BROMOIDES L. Glareal. Locally common. Leckwith, etc.!

F. MYURUS L. Glareal. Scarce. Leckwith, etc.!

*BROMUS RIGENS L. Casual. Barry, etc., *B.E.C.*, 1027, 1925.

*B. RIGIDUS Roth. Casual. Cardiff, etc., *J.B. Supp.*, 87, 1907.

B. STERILIS L. Glareal. Common!

*B. TECTORUM L. Casual. Cardiff, etc., *J.B. Supp.*, 87, 1907.

B. MADRITENSIS L. Adventive, Splott: native? on red marl, Penarth, *Fl. Glam.*, 182.

B. RAMOSUS Huds. Sylvestral. Locally common. Cwrt-yr-ala, etc.!

B. ERECTUS Huds. Pascual. Glareal. Locally common. St Nicholas, etc.!

*B. UNIOLOIDES H.B.K. Viatical. Waste ground!, *B.E.C.*, 116, 1932.

*B. SECALINUS L. Agrestal, etc. Cadoxton!, etc.

b. VELUTINUS (Schrad.) Koch Penard Castle, Bot. Gaz., Vol. 1.

c. SUBMUTICUS (Reichb.). Splott, *B.E.C.*, 767, 1928.

B. PRATENSIS Ehrh. Pratal. Locally common. Pengam Marshes, etc., *J.B. Supp.*, 69, 1907.

b. PUBESCENS (Wats.). Penylan!, teste W. O. Howarth.

B. RACEMOSUS L. Pratal, etc. Rare. Caerau, *J.B.*, 411, 1909.

B. HORDACEUS L. Pratal, etc. Common. Aberthaw, etc., teste W. O. Howarth.

b. GLABRATUS (Döll) Dr. Porthkerry!, teste W. O. Howarth.

c. LEPTOSTACHYS (Pers.) Beck. Barry!, teste W. O. Howarth.

d. NANUS (Weig.). Coast burrows, *B.E.C.*, 691, 1919.

B. THOMINII (Bréb.). Aberdare, *J.B. Supp.*, 69, 1907.

B. LEPIDUS A. R. Holmberg. Cardiff, *B.E.C.*, 679, etc., 1931.

B. MOLLIFORMIS Lloyd. Near Penard, etc., *J.B. Supp.*, 69, 1907.

*B. ARVENSIS L. Casual. Splott!

BRACHYPODIUM SYLVATICUM (Huds.) R. & S. Septal, Sylvestral. Common!

b. GLABRESCENS Coss. & Germ. Pyle, Hb. Motley.

B. PINNATUM (L.) Beauv., f. LOLIACEUM Asch. & Graeb. Pascual. Rare. Nash Cwm, etc!, teste W. O. Howarth.

b. PUBESCENS S. F. Gray. Tresillian Bay!, teste W. O. Howarth.

LOLIUM PERENNE L. Pascual, etc.!

b. SPHAEROSTACHYUM Masters. Pengam Marshes, etc., *J.B. Supp.*, 70, 1907.

c. CRISTATUM Döll. Cardiff!, teste W. O. Howarth.

d. ARISTATUM Schum. Aberdare, etc., *J.B. Supp.*, 69, 1907.

e. ORGYALE Döll. Splott, *B.E.C.*, 767, 1928.

*L. TEMULENTUM L. Casual. Splott. etc.!

b. ARVENSE (With.). Splott, etc.!

*L. MULTIFLORUM Lam. Adventive. Barry Docks!, teste W. O. Howarth.

AGROPYRON JUNCEUM (L.) Beauv. Littoral. Locally common. The Leys, etc.!

b. MEGASTACHYUM (Fr.) Dr. Crumlin Burrows. *J.B. Supp.*, 70, 1907.

A. PUNGENS R. & S. Littoral. Locally common. Ely estuary, etc.!

A. REPENS L. Agrestal. Common!

A. CANINUM Beauv. Sylvestral. Locally common. Banks of River Taff, etc.!

LEPTURUS FILIFORMIS Trin. Littoral. Locally common. Aberthaw, etc.!

*L. INCURVUS (L.) Dr. Splott, *B.E.C.*, 116, 1932.

NARDUS STRICTA L. Ericetal. Common. On moors!

HORDEUM NODOSUM L. Pratal. Locally common. Cogan Moors!

H. MURINUM L. Glareal. Locally common. About Cardiff!

H. MARINUM L. Littoral. Rare. The Leys!

*H. JUBATUM L. Adventive. Appearing yearly, waste ground and marshes near Splott!

ELYMUS ARENARIUS L. Littoral. Swansea, Moggridge, etc.

JUNIPERUS COMMUNIS L. Ericetal, local. Sea cliffs, etc, Gower!

TAXUS BACCATA L. Sylvestral. Locally common. Limestone at Cwrt-yr-ala, etc.!

PINUS SYLVESTRIS L. Ericetal. Native on hills near Aberdare, *J.B. Supp.*, 58, 1907; perhaps Cwrt-yr-ala!

*P. PINASTER Ait. Planted, Blackpill, etc., *J.B. Supp.*, 86, 1907.

*LARIX DECIDUA Mill. Planted in wood near Merthyr Mawr!, *J.B. Supp.*, 86, 1907.

EQUISETUM MAXIMUM Lam. Uliginal, etc. Locally common. Llandough!, etc.

b. SEROTINUM Braun. Llandough!, *B.E.C.*, 755, 1922.

E. ARVENSE L. Agrestal, etc. Common!

b. NEMOROSUM Braun. Parkmill, etc., *J.B. Supp.*, 72, 1907.

E. SYLVATICUM L. Sylvestral. Scarce. Pendoylan, etc.!

b. CAPILLARE Hoffm. Cefn On, *Fl. Glam.*, 192.

E. LIMOSUM L. Paludal. Locally common. Sant-y-nil, etc.!

b. FLUVIATILE (L.). "Thinly scattered throughout county," *J.B. Supp.*, 72, 1907.

E. PALUSTRE L. Paludal. Common. Kenfig Dunes, etc.!

b. POLYSTACHYUM Weig. Crumlin Burrows, *J.B. Supp.*, 72, 1907.

c. NUDUM Duby. Crumlin Burrows, *J.B. Supp.*, 72, 1907.

E. HYEMALE L. Rare. Railway bank, Llanishen!, *B.E.C.*, 425, 1927.

E. VARIEGATUM (Schleich.) Weber. Paludal, local. Crumlin Burrows, etc.!

CRYPTOGRAMMA CRISPA Br. Rupestral. Rare. Mynydd Mayo!, etc.

EUPTERIS AQUILINA (L.) Newm. Ericetal. Common!

ADIANTUM CAPILLUS-VENERIS L. Rare. Damp lias cliffs by the sea!

BLECHNUM SPICANT (L.) With. Ericetal, etc. Common!

PHYLLITIS SCOLOPENDRIUM (L.) Newm. Rupestral, Sylvestral. Common!

ASPLENIUM MARINUM L. Maritime rocks, Gower, etc.!

A. TRICHOMANES L. Rupestral. Common!

A. VIRIDE Huds. Rupestral. Rare. Morlais Castle, etc.!

A. LANCEOLATUM Huds. Rupestral. Rare. Near Pontypridd, Hb. U.C., *Fl. Glam.*, 187, etc.

A. ADIANTUM-NIGRUM L. Rupestral. Locally common. Caerphilly, etc.!

A. RUTA-MURARIA L. Rupestral. Common!

ATHYRIUM FILIX-FOEMINA (L.) Roth. Sylvestral. Common!

b. ERECTUM Syme. Crumlin Bog, etc., *J.B. Supp.*, 71, 1907.

c. INCISUM Newm. Aberpergwm, *J.B. Supp.*, 71, 1907.

POLYSTICHUM SETIFERUM (Forsk.) Woynar. Sylvestral. Locally common. Thornhill!, etc.

P. LOBATUM (Huds.) Woynar. Sylvestral. Locally common. Castell Coch, etc.!

b. CAMBRICUM (S. F. Gray). Vale of Neath, etc.!

(P. LONCHITIS (L.) Roth. Records, *T.B.*, etc., doubtless refer to b. *cambricum*).

DRYOPTERIS FILIX-MAS (L.) Schott. Sylvestral. Common!
  b. AFFINIS Newm. Garth Wood, etc., *J.B. Supp.*, 71, 1907.
  c. PALEACEA (Don) Dr. Morlais Castle!, etc.

D. SPINULOSA Kuntze. Sylvestral. Rare. Ystradowen, etc.!
  b. DECIPIENS (Syme) Dr. Radyr, *J.B.*, 411, 1909.

D. ARISTATA (Vill.) Dr. Sylvestral. Common!
  b. TANACETIFOLIA (Lam. & DC.) Dr. Radyr, *J.B.*, 411, 1909.
  e. ALPINA (Moore) Dr. Mountain above Nantymoel!, teste Alston.

D. AEMULA Kuntze. Sylvestral. Dimbath Valley!

D. OREOPTERIS (Ehrh.) Maxon. Ericetal. Locally common. Mynydd-y-glew, etc.!

D. THELYPTERIS (L.) A. Gray. Uliginal. Rare. Singleton Bog!, etc.

D. PHEGOPTERIS (L.) Christ. Rupestral, local. Draethen, etc.!

D. ROBERTIANA (Hoffm.) Christ. Limestone rocks, rare. Morlais Castle!, etc.

PHEGOPTERIS DRYOPTERIS Fée. Sylvestral, local. Craig-y-Llyn, *Fl. Glam.*, 190.

CYSTOPTERIS FILIX-FRAGILIS (L.) Bernh. Rupestral, local. Morlais Castle, etc.!
  b. DENTATA (Hook.). Kilvey Hill, Gutch, etc.

POLYPODIUM VULGARE L. Rupestral. Common!
  b. SERRATUM Milde. Leckwith wood, etc.!
  c. CAMBRICUM Lightf. Near Dinas Powis!

CETERACH OFFICINARUM DC., em. Willd. Rupestral. Common!
  b. CRENATUM Milde. Aberdare, etc., *J.B. Supp.*, 71, 1907.

HYMENOPHYLLUM TUNBRIGENSE (L.) Sm. Rupestral. Rare. Dimbath Valley!, etc.

H. PELTATUM Desv. Rupestral. Scarce. Dimbath Valley!, etc.

OSMUNDA REGALIS L. Paludal, local. Gower, etc.!

BOTRYCHIUM LUNARIA (L.) Sw. Ericetal. Scarce. Newton Burrows, etc.!

OPHIOGLOSSUM VULGATUM L. Pratal. Locally common. Southerndown, etc.!
  b. POLYPHYLLUM Braun. Whitford Burrows, fide E. F. Linton.

PILULARIA GLOBULIFERA L. Uliginal. Rare. Mynydd-y-glew!

ISOETES LACUSTRIS L. Lacustral. Rare. Llynfach, etc., *Fl. Glam.*, 193, etc.

I. ECHINOSPORA Durieu. Lacustral. Rare. Llynfawr!

(LYCOPODIUM ALPINUM L. Near Swansea, Moggridge, etc., Glam.?)

L. CLAVATUM L. Ericetal. Near Swansea, Dillwyn.

L. SELAGO L. Ericetal. Rare. Hills above Nantymoel!, etc.

(SELAGINELLA SELAGINOIDES (L.) Link. Mountains near Glyn Corrwg, etc., Fl. J.S., 103).

NITELLA OPACA Ag. Lacustral. Rare. Clyne Common, *J.B.*, 377, etc., 1886.

N. FLEXILIS Ag. Lacustral. Rare. Mynydd-y-glew!, *B.E.C.*, 144, 1926.

Tolypella glomerata Leonh. Lacustral. Rare. Crumlin Burrows, *J.B.*, 377, 1886.

Chara vulgaris L. Lacustral. Locally common. Cogan marshes, etc.!

b. longibracteata Kuetz. Porthcawl sands, *J.B. Supp.*, 73, 1907.

c. papillata Wallr. Porthcawl sands, *J.B. Supp.*, 73, 1907.

(C. hispida L. Lacustral. Crumlin Bog, *B.G.*).

C. contraria Kuetz. Lacustral. Oxwich, H. & J. Groves, etc.

C. aspera Willd. Lacustral. Locally common. Kenfig Pool!, etc., teste W. H. Pearsall.

b. lacustris H. & J. Gr. Kenfig Pool!, teste W. H. Pearsall.

C. fragilis Desv. Lacustral. Locally common. Oxwich, etc.!

C. delicatula Ag. Lacustral. Rare. Welsh St Donats, etc., *J.B. Supp.*, 73, 1907.

HYBRIDS.

Ranunculus Lenormandi F. Schultz × lutarius? Rhossili. *J.B. Supp.*, 5, 1907.

Viola silvestris Lam. × Riviniana = intermedia Reichb. Taffs Well, etc., *J.B. Supp.*, 13, 1907.

V. canina L., b. ericetorum Reichb. × lactea = pumiliformis R. & F. Gower!, teste Mrs Gregory.

V. canina L. × Riviniana. Llanharry!, teste P. M. Hall.

V. epipsila Ledeb. × palustris. Caerphilly!, teste Mrs Gregory.

Lychnis alba Mill. × dioica = intermedia (Schur). Grangetown!, teste Dr Druce, *B.E.C.*, 567, 1927.

L. dioica L. × Preslii = Troweriae Dr. Natural hybrid in garden at Ely Garden City.

Rubus caesius L. × rusticanus. Probably frequent. Whitford Burrows, etc., *J.B.*, 94, 1906.

R. vestitus W. & N. × rusticanus. Langland Bay, etc., *J.B.*, 94, 1906.

Potentilla procumbens × reptans = mixta Nolte. Penarth, *Fl. Glam.*, 60.

P. erecta (L.) Hampe × procumbens = suberecta Zimm. Llanharry, *Fl. Glam.*, 60.

P. erecta (L.) Hampe × reptans = italica Lehm. Caerphilly Mountain!

Geum rivale L. × urbanum = intermedium Ehrh. Near Coedryglan, etc., *Fl. Glam.* 59.

Epilobium hirsutum L. × montanum = anglicum E. S. Marshall. Cathays, Cardiff!, teste Dr Druce.

E. hirsutum L. × parviflorum = intermedium Reichb. Cardiff!, *Fl. Glam.*, 69.

E. parviflorum Schreb. × roseum = Gorzii Rubn. Aberdare, *J.B. Supp.*, 31, 1907.

E. obscurum Schreb. × palustre = Schmidtianum Rostk. Probably this, Oxwich, *J.B. Supp*, 31, 1907.

E. obscurum Schreb. × tetragonum = thuringiacum Haussk. Aberdare, *J.B. Supp.*, 31, 1907.

E. montanum L. × obscurum = aggregatum Čelak. Swansea, *J.B.*, 297, 1892.

E. montanum L. × parviflorum = limosum Schur. Near Cardiff!, teste G. M. Ash.

E. montanum L. × roseum = heterocaule Borbas. Swansea, *J.B.*, 297, 1892.

Senecio squalidus L. × vulgaris, c. erectus. Cathays Park, Cardiff, *Fl. Glam.*, 93.

Carduus acanthoides L., b. crispus (L.) × nutans = Newbouldii (Wats.). Llantwit Major, *J.B. Supp.*, 39, 1907.

Cirsium acaule (L.) Weber × pratense = Woodwardii (Wats.). Cardiff Docks, *J.B. Supp.*, 39, 1907.

C. arvense (L.) Scop. × palustre. Penylan!, *B.E.C.*, 118, 1926.

C. tuberosum (L.) All. × palustre. Nash, *J.B.*, 16, 1933.

Linaria vulgaris Mill. × repens = sepium (Allm.). Grangetown, persisting.

Thymus Pulegioides L. × pycnotrichus = Henryi Ronn. Glyn Neath, *B.E.C.*, 510, 1927.

Chenopodium album L. × opulifolium = Preismanni Murr. Barry, *B.E.C.*, 415, 1927.

Salicornia herbacea × ramosissima Moss & Salisb. Llanmadoc, *J.B. Supp.*, 54, 1907.

(S. herbacea × pusilla Moss & Salisb. = intermedia. Apparently this, Wood, Llanmadoc, *J.B. Supp.*, 54, 1907).

Rumex crispus L. × obtusifolius = acutus L. Llandough, *Fl. Glam.*, 138.

Euphorbia Paralias L. × portlandica. Apparently this, Margam Moors, *J.B. Supp*, 56, 1907.

Salix triandra L. × viminalis = hippophaefolia Thuill. Near Pyle, *J.B.*, 250, 1902.

S. triandra L. × viminalis, b. Trevirani (Sprengel). Ely Bridge!, teste J. Fraser.

S. caprea L. × atrocinerea = Reichardtii A. Kern. Aberdare, *J.B. Supp.*, 57, 1907.

S. caprea L. × repens = Laschiana Reisl. & Brand. Whitford Burrows, *Fl. Glam.*, 144.

S. aurita L. × caprea = capreola J. Kern. Whitchurch, *J.B.*, 408, 1909.

S. atrocinerea Brot. × aurita = lutescens A. Kern. Penylan!, teste J. Fraser.

S. aurita L. × repens = ambigua (Ehrh.). Cwmbach, Aberdare, *B.E.C.*, 124, 1911.

S. aurita L. × viminalis = fruticosa Döll. Aberdare, *B.E.C.*, 124, 1911.

S. atrocinerea Brot. × purpurea = sordida Kern. Taffs Well, *J.B. Supp.*, 57, 1907.

S. ANDERSONIANA Sm. × ATROCINEREA = STREPIDA Forbes. Aberdare, *J.B. Supp.*, 57, 1907.

JUNCUS EFFUSUS L. × INFLEXUS = DIFFUSUS Hoppe. Crumlin Bog, *J.B.*, 297, 1892.

CAREX ACUTIFORMIS Ehrh. × RIPARIA. Fairwater, *J.B.*, 410, 1909.

C. FLAVA L. × FULVA = XANTHOCARPA Dégl. Ystradowen!, teste A. Bennett.

C. ELATA All. × GOODENOWII. Flemingstone Moors, *J.B. Supp.*, 65, 1907.

C. ELATA All. × GRACILIS. Flemingstone Moors, *J.B. Supp.*, 65, 1907.

C. GOODENOWII Gay × GRACILIS. Crumlin Bog, *J.B. Supp.*, 65, 1907.

GLYCERIA FLUITANS × PLICATA = PEDICILLATA. Whitchurch!, teste Dr Butcher.

TRITICUM JUNCEUM Beauv. × REPENS = HACKELLII Dr. Margam Moors!, teste Dr Druce.

LOLIUM TEMULENTUM L. × PERENNE. Cardiff, teste W. O. Howarth.

CORRECTIONS AND ADDITIONS—REPORT 1932.

p. 89. 55/1. Fresh should be French.

p. 131. 600/12. For *dolicophyllum* read *dolichophyllum*.

p. 208. Bottom. Miss E. M. Harding should be Harting.

p. 400. GUERNSEY. Correct figures as follow:—Five Maps, Flowering Plants 828, Ferns and allies 29, Mosses 156, Hepaticæ 41, Fungi 624, Lichens 334, Algæ 641.

SUPPLEMENT to above, M. A. McCrae, 1923, published in Transactions of the Guernsey Society.

LESSER CHANNEL ISLES.

Delete lines 2 and 3 (Alderney. Brechou, etc.). These are included in the above Supplement, 1923.

p. 401. DEVONSHIRE.

Amend first line; " No recent Flora. One is contemplated by The Devonshire Association."

Line 17 from bottom of page. Amend, " Rep. Devon Ass., 1917 et seq." From 1926-1932 edited by Mr G. T. Harris.

Add to list—The Botany chapter in the Victoria History of Devon, vol. i, pp. 55-130, 1906.

Devon Botany—Presidential Address by Mr W. P. Hiern, Trans. Devon Association, 1917.

A New List of the flowering plants and ferns growing wild in the county of Devon by T. F. Ravenshaw, 1860, and second ed. with suppl., 1872.

Handbook of the Torquay Flora, Robert Stewart, 1860.

Manual of the Flora of Torquay, Miss C. E. Larter, 1900.

Flora Sidostiensis, Cullen, 1849.

Braunton, Dr F. R. Elliston Wright, revised edition, 1932.

p. 415. NORTHUMBERLAND.

(Add) Notes on plants found in the district worked by the Berwickshire Naturalists' Club. By A. H. Evans, M.A. Vol. xxiii, 217-235. Neill & Co., Edinburgh, 1917. (See Berwickshire, p. 418, line 3.)

MEMBERS' NAMES OR ADDRESSES.

p. 5. G. Goode, M.A. Should have been under CORRESPONDING MEMBERS.

p. 7. R. W. Butcher, B.Sc., Ph.D., F.L.S., 12 St James' Terrace, Winchester.
p. 7. H. N. Chamberlaine-Brothers, Batchcote Hall, Leebotwood, Shropshire.
p. 8. A. E. Ellis, M.A., F.L.S., Epsom College, Surrey.
p. 11. E. Milne-Redhead, M.A., The Herbarium, Kew.
p. 13. G. R. A. Short, 36 Parkside Drive, Edgware, Middlesex.
p. 14. National Museum of Wales, Cardiff (H. A. Hyde, M.A., F.L.S., Keeper of the Department of Botany).

BR. MU
7 JUL 1934
BOTANY

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REPRINTS

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OF THE

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(CONVENIENTLY ABBREVIATED REP. B.E.C.)

BY THE

EDITOR AND DISTRIBUTOR,

F. RILSTONE, Esq.

VOL. X. PART IV.

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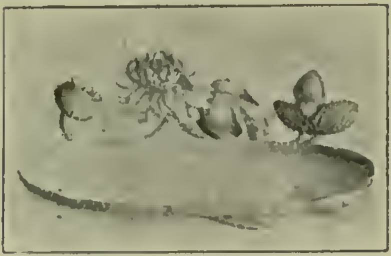

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REPORT OF THE DISTRIBUTOR FOR 1933.

THE number of sheets contributed for the 1933 exchange was slightly higher than that of the previous year—25 members sent in 2552 sheets representing 190 gatherings.

The record of these in the following pages provides an effective answer to the criticism sometimes levelled at the Exchange Club that it encourages the raiding of plant rarities.

The members, in fact, are chiefly interested in the critical study of the British flora, particularly such difficult genera as *Rubus*, *Rosa*, *Mentha*, *Salix* and *Carex*, and value the exchange mainly as a medium for distribution and discussion of interesting material. Where requests are made for the return parcel the emphasis is on the discussion-provoking plants and "Rarities not particularly wanted" is sometimes expressed and often implied.

Grateful acknowledgment must again be made of the work of the referees:—Mrs H. Drabble, Rev. H. J. Riddelsdell, Messrs W. C. Barton, C. E. Britton, E. B. Bishop, H. W. Pugsley, J. Fraser, W. O. Howarth, W. H. Pearsall, and A. J. Wilmott.

F. RILSTONE.

POLPERRO, March 22nd, 1934.

LIST OF PARCELS RECEIVED.

	No. of Gatherings.	No. of Sheets.
W. Biddiscombe	4	42
C. E. Britton	7	125
G. C. Brown	8	99
R. Bulley	13	126
R. J. Burdon	6	84
J. Chapple	14	175
R. H. Corstorphine	3	51
H. Foster	10	108
J. Fraser	6	104
J. D. Grose	1	18
P. M. Hall	11	134
I. Helsby	2	28
H. H. Johnston	15	293
J. W. Long	5	89
J. E. Lousley	14	184
R. Melville	3	28
W. H. Pearsall	2	12
F. Rilstone	1	20
W. A. Sledge	10	134
F. A. Sowter	2	44
Miss E. Vachell	2	42
National Museum of Wales	5	43
C. Waterfall	17	192
C. E. Wallace	15	268
W. Watson	14	109
	190	2552

Ranunculus Flammula L., var. *petiolaris* Lange. *R. scoticus* E. S. Marshall. In shallow water round the gravelly margin of Loch Meala, Armadale, W. Sutherland, v.-c. 108, June 28, 1933.—R. H. Corstorphine. "Very acceptable specimens and admirably presented."—W. H. Pearsall. "Judging by the habit of this, its habitat, long petioles, and small blades of the leaves it is correctly named. The species is very variable, and I have more than one robust form, but neither of them like this."—Fraser. "Beautiful specimens of this variety which was first described in *Journ. Bot.*, xxvii, p. 230 (1889). A year later Marshall stated that he considered that it deserved higher rank, and in 1892 he described it as a species with a plate (*Journ. Bot.*, xxx, p. 289, t. 328). Finding that the specific name *R. petiolaris* was preoccupied he renamed the plant *R. scoticus* (*Journ. Bot.*, xxxvi, p. 103, 1898, and *Ann. Scot. Nat. Hist.*, 1898, p. 122). Marshall appears to have adhered to his opinion that the plant was a good species, and repeatedly pointed out that it remained constant in cultivation (there are specimens in Herb. Brit. Mus. grown in his Surrey garden for four years). Druce, however, considered it a variety of *Flammula* (*Rep. B.E.C.*, 1898, p. 564) and Bennett a subspecies (*Rep. B.E.C.*, 1899, p. 596), while Moss even reduced it to a sub-variety of his var. *suberectus* (*Camb. Br. Flora*, iii, p. 128, 1920). The 'zig-zag' stem appears to be inconstant, and Moss states that the first leaves do not have linear laminae as stated by Marshall, so that apparently the long petioles of the lower stem leaves are the only character of diagnostic value."—Lousley.

Ranunculus peltatus Schrank, near var. *floribundus* (Bab.). Pond near Old Byfleet, Surrey, (Ref. No. E.15), May 16, 1933.—J. E. Lousley. "A form of *R. peltatus* frequently met with. It is not var. *floribundus*, the flowers are too small and the plant lacks the essential very long and slender petioles of that variety."—Pearsall.

Fumaria officinalis L., forma? Near Riever, Berks, June 1933.—J. Chapple. "Yes; weak *F. officinalis* L."—Pugsley.

Cardamine bulbifera Crantz. Chandler's Cross, Herts, April 17, 1933.—I. Helsby. "Correct."—Fraser.

Cardamine impatiens L. Banks of Upper Medway near Leigh, S.W. Kent, June 7, 1932.—W. H. Pearsall. [Will members please amend their labels].

Draba muralis L. Foot of limestone wall, Malham, West Yorks, May 3, 1933.—H. Foster.

Cochlearia anglica L. Bank of the River Dee, The Cop, Flintshire, N. Wales, May 23, 1933.—C. Waterfall.

Sisymbrium officinale (L.), var. *leiocarpum* DC. Kirkstall, W. Yorks, July 10, 1933.—H. Foster.

Sisymbrium austriacum Jacq. Kirkstall, Leeds, W. Yorks, July 10, 1933.—H. Foster. "The segments of the leaves are too deeply cut, too long and narrow for *S. austriacum*. My specimens are *S. pannonicum* Jacq"—Fraser. "This is *S. pannonicum* Jacq, which has pods 6 cm. or more, and long and linear upper leaves. *S. austriacum* has pods not longer than 4 cm. as a rule and the upper leaves are runcinate."—Melville.

Diplotaxis muralis DC. Cultivated field, Woking, Surrey, August 1933.—W. Biddiscombe.

Diplotaxis muralis DC. Waste ground, Colwick, Notts, August 2, 1933.—R. Bulley. "This leafy-stemmed plant is *D. muralis* DC., var. *Babingtonii* Syme. At least that applies to the piece I have received. The leaves are also much longer than average ones, owing to rich soil." —Fraser. "This is the leafy-stemmed form, var. *caulescens* Kittel (=*Babingtonii* (Syme)), vide *Rep. B.E.C.*, 159, 1932."—Hall.

Capsella Bursa-pastoris Medik., var. *trevirorum* E. At. Waste ground, Cardiff, Glam., v.-c. 41, June 14, 1933, coll. A. E. Wade; comm. Dept. of Botany, National Museum of Wales, per H. A. Hyde. "I believe this to be identical with the form of Shepherd's Purse named by Almquist, *Capsella Bursa-pastoris* (L.), *trevirorum* E. At."—Britton.

Capsella Bursa-pastoris Medik., var. Waste ground, Cardiff, Glam., v.-c. 41, coll. A. E. Wade; comm. Dept. of Botany, National Museum of Wales, per H. A. Hyde.

Viola monticola Jord. Near Horndean, South Hants, v.-c. 11, May 1933, (Ref. No. 920). This gathering is sent for comparison with the gathering, Ref. No. 851, distributed in 1932. Both gatherings came from the same part of the same field, in which a very large number of pansies grows but all belong to one species only. The normal state now distributed is a very different looking plant to the autumnal state previously sent out. The spring plant is taller and more erect, with longer internodes, the stipules are broader-lobed, and the short branches at the base, which are said to be a character of *V. monticola*, are very little in evidence. These basal branches are therefore probably a character of the autumnal plant and have themselves become the erect branches of the vernal plant. Other differences noted were that in the spring more of the flowers had the upper petals tinged with blue and a larger (but still only a small) portion of the plants were small-flowered. —P. M. Hall. "Yes, *V. monticola*, though the middle leaves are rather narrower than the type—a few of the sheets show evidence of the characteristic small-leaved barren base branches."—Hilda Drabble.

"This agrees with the pale yellow form from the same locality. The upper petal is shaded with blue, but the whole flower is sometimes similarly shaded. This specimen has three old stems of 1932."—Fraser.

Viola variata Jord. Near Manor Farm, Sandridge, W. Kent, v.-c. 16, May 28, 1933. Ref. Nos. 938/9 and 938/12. The eight sheets of 938/9 and five sheets of 938/12 are in each case all taken from one large plant.—P. M. Hall. "Yes, very typical *V. variata* Jord.—both sets." —Hilda Drabble.

Viola lepida Jord. Near Manor Farm, Sandridge, W. Kent, v.-c. 16, May 28, 1933. The six sheets of each gathering are taken from one large plant pulled to pieces, in each case.—P. M. Hall. "Yes, *V. lepida*—both sets—many showing very well the typical perennial twiggy procumbent stems."—Hilda Drabble.

Stellaria media Vill. (? the plant intended by Marshall as "*decipiens*"). Ref. No. E.7. Near Nettledon, Berkhampstead, Herts, April 31, 1933. These plants recall *S. neglecta* Weihe in habit and size, but have the small flowers and seeds of *S. media* Vill., and are probably a luxuriant form of the latter. They may represent the "*S. umbrosa*, var. *decipiens*," described by the late E. S. Marshall in *Journ. Bot.*, 1902, p. 215, and *l.c.*, 1906, p. 117, which proved so "elusive" to Salmon (*Fl. Surrey*, 183, 1931) and White (*Fl. Bristol*, 193) and is rightly discounted by Pugsley (*Rep. Watson Club*, 62, 1930, and 116, 1931). Further notes on *S. neglecta* will be found in *Journ. Bot.*, 215, 1876; 183, 1878; and 151 and 206, 1904.—J. E. Lousley. "Rightly placed to this and not to *S. neglecta* Weihe. It is a sub-glabrous state and if it were not for the inconspicuous line of hairs on the stem I would suggest that it was var. *glaberrima* Beck. The sub-glabrous sepals appear more obtuse than is usual, and are furnished with a few long hairs, partly moniliform, and many sessile or sub-sessile glands. The stamens appear to be three or five in number, the seeds are light or dark brown, and bluntly tubercular."—Britton.

Stellaria neglecta Weihe. Swamp below Charterhouse, Godalming, Surrey, November 7, 1933. Sent for comparison with the Nettledon *Stellaria*.—J. E. Lousley.

Hypericum perforatum L. Roadside bank near Rhyd-y-newyn Station, Flintshire, N. Wales, July 19, 1933.—C. Waterfall.

Malva moschata L. Waste ground about gravel quarry spoil bank, near Rhyd-y-newyn, Flintshire, N. Wales, July 19, 1933.—C. Waterfall.

Erodium cicutarium L'Hér. Sandy wall-side near Brean Down, Somersetshire, v.-c. 6, June 27, 1933.—C. Waterfall.

Euonymus latifolius Scop. Chaldon, Surrey, May 16, 1933. (Ref. No. 4072). In hedge of field. Established there for many years past and gathered elsewhere in Surrey under similar conditions.—C. E. BRITTON. "Correctly named. In some books Müller is said to be the authority for the name."—FRASER. "Yes, the large-leaved form (a) *grandifolius* Rouy (*Fl. France*, iv, 160, 1897). There is an interesting note on this species by H. S. Thompson in *Journ. Bot.*, lvi, 301, 1918."—LOUSLEY.

Ulex minor Roth. (Ref. No. 964). Near Lyndhurst, S. Hants. v.-c. 11, September 3, 1933.—P. M. HALL. "Correct. Some of the primary spines are 2-2.5 cm. long as if going towards var. *longispinosus*."—FRASER.

Medicago falcata L. (Ref. No. 4075). Abinger, Surrey, July 15, 1933.—C. E. BRITTON. "Correct."—FRASER.

Medicago lupulina L., "var." *unguiculata* Ser. Sanderstead, Surrey, July 17, 1933. Ref. No. 4097. Not of the status of a variety but an abnormal state with greenish flowers, the petals aborted or absent, and the ovary acuminate and falcate.—C. E. BRITTON. "*Medicago lupulina, var. unguiculata*, was described by Seringe as 'floribus apetalis leguminibus falcatis vix nervosis stipitatis unguiculatis' (DC. *Prodromus*, ii, 172, 1825), and is illustrated in Reichenbach (*Deutchlands Flora*, xxii. t. 73, fig. iv, 1900-3) as 'Eine Monstrosität mit halbriefen graden Fruchtknoten.' The present specimens, however, have small petals present, which is allowed in the emended description given by Rouy (*Fl. France*, v, 9, 1899). Such a condition does not properly belong to the study of taxonomy, but is a teratological state, and as such is mentioned by Masters, *Veg. Teratology*, 432, 1869."—LOUSLEY.

Melilotus indica All. Waste ground, Lenton, Notts, July 5, 1933.—R. BULLEY. "Correct. It has also been named *M. parviflora* Desf. in allusion to the very small flowers."—FRASER.

Trifolium arvense L. Sand dunes at edge of Golf Links, Weston-super-Mare, Somerset, v.-c. 6, June 21, 1933.—C. WATERFALL.

Lotus uliginosus Schk., var. *glabriusculus*. Adel, W. Yorks, July 27, 1933.—H. FOSTER. "Yes, *Lotus uliginosus* Schkukr, var. *glabriusculus* Bab. Man. Brit. Bot., 77, 1843."—PEARSALL. "I agree; it would have given better means of identification if more flowers in the bud state had been collected."—FRASER.

Coronilla varia L. Well established near the railway sidings, Newhaven, East Sussex, where it was pointed out to me by Miss K. Pickard, June 25, 1933.—J. E. LOUSLEY.

Lathyrus Nissolia L. St Helen's, Isle of Wight, July 1, 1933.—H. FOSTER.

Pyrus Cydonia L. (teste H. W. Pugsley). Near Chiddingstone, West Kent. (Ref. No. E.8). Flowers, May 6, 1933; fruit, August 26, 1933. I am indebted to Mr E. C. Wallace for this locality, whence he sent me specimens collected May 25, 1931, labelled *Pyrus germanica*, which the Quince resembles when in flower. The synonymy includes *Cydonia oblonga* Mill and *Cydonia vulgaris* Pers. At this locality about eight old bushes occur round the margin of a roadside pond looking as much at home as the native trees which adjoin them. The Quince, as is well known to gardeners, thrives under such moist conditions, but the few fruits are hard and dry, and quite unsuited for use in the preparation of preserves.—J. E. LOUSLEY. "Doubtless the *P. Cydonia* of Linnaeus, but he describes it badly by saying that the calyx is as long as the corolla. It may be that this is a large-flowered form which has originated in cultivation. The common Quince is now generally named *Cydonia vulgaris* Pers."—FRASER. Later . . . This has also occurred under natural conditions between Chelsfield and Lullingstone, Kent (*Rep. B.E.C.*, 19, 1911), where it was probably likewise mistaken for the Medlar.—LOUSLEY.

Rubus plicatus Wh. & N. Roadside near Butcher's Green, Stanway, N. Essex, v.c. 19, July 11, 1933. Petals white, sepals patent in flower and after. (Ref. No. 2494).—G. C. BROWN. "I suppose *R. plicatus* Wh. & N., but not typical.—RIDDELSDELL.

Rubus cardiophyllus L. & M. Boar's Hill, Berks, June 23, 1933. (Ref. No. C.30).—J. CHAPPLE. "As Rogers (*Handbook*, 30) points out, the ordinary British form of *R. rhamnifolius* Wh. & N. (represented by the present gathering) constantly differs from Mueller's description of *R. cardiophyllus* in one or two points, but otherwise comes very near to it. I have not seen an authentic specimen of *R. cardiophyllus*, nor any British plant which quite agrees with the description, nor indeed any which agrees with Continental specimens of *R. rhamnifolius* Wh. & N."—RIDDELSDELL.

Rubus Winteri Focke (*R. argentatus* P.J.M., *R. Godroni* Lec. & Lam.). "Grimes Dyke," Stanway, N. Essex, v.c. 19, July 11, 1933. Petals deep pink, stamens equalling styles, sepals patent in flower, then reflexed. Rev. H. J. Riddelsdell says of my original gathering (1498), July 28, 1919, "Very poor stem-pieces but I should certainly put it to *R. Godroni*."—G. C. BROWN. "A sheet of Wirtgen's, No. 1063 (Herb. Fl. Rhen.) *Rubus Winteri* P.J.M. inedit., now before me, shows a panicle much like Brown's in outline and in details, but the stem is quite different, being round and with large long-based, nearly patent prickles; leaf toothing, too, is apparently much less coarse. I do not think we can apply the name *Winteri* to the Stanway plant. The stem looks poor as in 1919. The general *Godroni* alliance however seems to be correct.—RIDDELSDELL. "*Rubus Winteri* P.J.M. *R. argentatus* P.J.M., and *R. Godroni* Lec. & Lam. are two names of a bramble which is known to occur only in the east of France."—WATSON.

Rubus vulgaris Wh. & N. Dartford Heath, West Kent, August 1933. Petals pure white, obovate-oblong; stamens white, reddening, noticeably longer than the greenish styles. Sepals at first patent after flowering, then more or less reflexed. Stem and rachis soon deep purple in the sun. Terminal leaflet somewhat lobed or split.—W. WATSON. "*R. vulgaris* of W. & N. has a thinly hairy stem, prickles more or less curved, and other features which this gathering has not; but it is apparently a variable species. In view of the description and figure of W. & N. *Rub. Germ.* and Continental specimens in my herbarium, I am very doubtful of the name being rightly applied here."—RIDDELSDELL.

Rubus macrophyllus Wh. & N. Wood, Parson's Heath, Colchester, N. Essex, v.-c. 19, July 14, 1933. Petals pink, sepals patent in flower, then reflexed. Rather shade-grown but seems typical otherwise.—G. C. BROWN. "Yes, *R. macrophyllus* Wh. & N., shade grown."—RIDDELSDELL and BARTON.

Rubus adscitus Genev. Boar's Hill, Berks, July 12, 1933. (Ref. No. C.34). Flowers cup shaped; petals white; styles exceeding stamens.—J. CHAPPLE. "Not *R. adscitus* Genev. I know the form well on Boar's Hill, and though it a little recalls *R. griseoviridis* Bart. & Ridd. (see *Proc. Cott. N.F.C.*, vol. xxiv, 1931 and 1932, pp. 201-5) it is most nearly related to *R. leucostachys* Sm. and *R. lasioclados* Focke."—RIDDELSDELL.

Rubus pyramidalis Kalt. Hedge by Churn Wood, Gt. Bromley, N. Essex, v.-c. 19, July 14, 1933. Petals white, sepals patent in flower and later. A small form but very characteristic of open gravel heathland. (Ref. No. 2490).—G. C. BROWN. "Yes, *R. pyramidalis* Kalt., as we understand it."—RIDDELSDELL and BARTON.

Rubus taeniarum Lindeb. Dartford Heath, West Kent, August 1933. Petals small, roundish obovate, abruptly clawed; pinkish. Stamens white, not so long as greenish styles; sepals patent.—W. WATSON. "In Herb. Brit. Mus. are two authoritative sheets issued by Lindeberg, Herb. Rub. Scand., Nos. 19 and 20, the former bearing a printed description label. *R. taeniarum* seems, as Lindeberg suggests, to be a northern form related to *R. infestus* Whe. The stem is almost glabrous and bears comparatively few arms; the 8 inch long panicle is lax with long ascending mostly 1-2 flowered branches, so that the flowers are distant and the rather irregular panicle very open; the sepals are mostly patent to clasping. Mr Watson's plant is more strongly armed, more hairy and glandular and his panicle is very different. Whatever the relation of *R. taeniarum* to *R. infestus* may be (and Focke and Areschoug include it under the latter), there seems to be no reason to apply the name to this British plant."—BARTON and RIDDELSDELL.

Rubus Genevierii Boreau. Milford Heath, Surrey, in an open situation, July 30, 1933.—W. WATSON. "These specimens agree fairly closely with Boreau's description and with authentic material so far as stem pieces go. The three sheets in Herb. Brit. Mus., which may be considered authoritative, all exhibit the pyramidal panicle slender and very lax right up to the top with distant patent or patent-erect branches, long peduncles and pedicels very aciculate and glandular and sepals uniformly grey long-haired aciculate and glandular. The panicle is so completely different from the sturdy cylindrical panicle with dense ultra-axillary part of Mr Watson's gathering as to make the acceptance of his plant as *R. Genevierii* Bor. quite impossible."—BARTON and RIDDELSDELL.

Rubus Genevierii Boreau. Oxleas Wood, Eltham, W. Kent, growing in partial shade, August 1933. Petals white, even in bud; stamens white, far exceeding the whitish, carmine-based styles; carpels pilose. —W. WATSON. "Neither *R. Genevierii* Bor. nor the same plant as that from Milford Heath sent under the same name."—BARTON and RIDDELSDELL.

Rubus foliosus Rogers. (*R. flexuosus* M. & L.). Hedge by Churn Wood, Gt. Bromley, N. Essex, v.-c. 19, July 14, 1933. (Ref. No. 2491). —G. C. BROWN. "Yes, clearly *R. flexuosus* P.J.M., in one of its many forms."—RIDDELSDELL and BARTON. "Is *Rubus foliosus*, sub-sp. *flexuosus* (M. & L.)."—WATSON.

Rubus ?foliosus Rogers Denham Golf Course, Bucks, July 1, 1933. (Ref. No. C.31).—J. CHAPPLE. "*R. pallidus* Wh. & N."—RIDDELSDELL.

Rubus hostilis M. & W. Cultivated (seed from Tooting Graveney Common, Surrey). August 1933. Petals oval-oblanceolate, rosy pink to pinkish. Stamens white (reddening) longer than the green styles. Calyx segments half reflexed in flower, then patent, at length erect. Fruit somewhat ovoid, composed of many small drupels.—W. WATSON. "There are two sheets of Wirtg. Hb. Rub. Rhen. (ii. 68, 98) in Herb. Brit. Mus. with description on label. Neither description nor specimens agree with the cultivated plant submitted. Some of the panicles are rather similar but not the stem. Specimens we have seen from the Rhineland provinces gathered in recent years are also quite different from Mr Watson's sheets. The considerable variation in armature and the irregular growth and fasciculation of branches in the panicles suggest a mixed strain in the seed; some of the stem pieces indeed look as if they had come from a different plant."—BARTON. "Wirtgen's decription of *R. hostilis* (Herb. Rub. Rhen., Ed. ii. 68) is inadequate, but even so far as it goes, it does not quite agree with Sudre's. It is anyhow impossible to give a judgment on this gathering without studying the original specimens. A specimen (Hb. Rilstone) from the Rhine provinces (1931) determined as *R. hostilis* would rule Watson's plant out completely."—RIDDELSDELL.

Rubus pygmaeopsis Focke. Court Wood, Selsden, Surrey, August 7, 1932. Petals rather small, obovate, tapered to the slender claw, pinkish in bud, then white. Stamens white, erect, appreciably longer than the red-based styles. Carpels glabrous. Fruit perfect, somewhat ovoid. Sepals at first reflexed after flowering, then patent or more or less erect. Occurs also in Stoke Wood, Oxshott, Surrey, and at Haslemere, Surrey.—W. WATSON. "In Herb. Brit. Mus. is one sheet of Wirtg. Hb. Rub. Rhen., ii, 82, and Sudre Bat. Eur., Nos. 561, 562. The Wirtgen sheet is not very satisfactory, but the two Bat. Eur. sheets exhibit a plant with almost glabrous stem (only a very few single hairs), and a panicle not unlike these specimens in most respects but with sepals clasping fruit. Sudre's 'inflorescentia brevis' is not borne out by the sheet of Bat. Eur., 562. The stem clothing and sepals (with other differences) definitely exclude these Selsden specimens from *R. pygmaeopsis* Focke, if Sudre Bat. Eur., 561, 562, are correctly named."—BARTON.

Rubus apricus Wimmer. From a seedling of the third year; seed collected at Bigberry, E. Kent, August 1933 (=*R. rosaceus*, var. *bercheriensis* Druce).—W. WATSON. "Not quite the same as the other gathering sent under this name, nor as the Boar's Hill plant. It will not do for *R. apricus* Wimm.; the terminal leaflet is not roundish-ovate, the rachis is not almost woolly, nor the upper part of the panicle dense semi-spherical. Wimmer's full and clear description definitely excludes both these plants."—BARTON and RIDDELSDELL.

Rubus apricus Wimmer (*R. rosaceus*, var. *bercheriensis* Druce). Cultivated (seed from Chislehurst, W. Kent), mature plant, August 1932. Petals white, narrow oval-rhomboid. Stamens white, equalling the red-based styles. Occurs also in S. Kent, Surrey, Sussex, Middlesex, Bucks, and Berks.—W. WATSON. "This is apparently the same form as the Boar's Hill *bercheriensis*. Comparison with Sud. Bat. Eur., Nos. 184 and 563, shows that it is not Wimmer's *apricus* as Sudre understood it; nor does it agree with Wimmer's description in stem armature and hair clothing, shape of terminal leaflet, or rachis clothing and armature. The name cannot be applied to this gathering."—BARTON and RIDDELSDELL.

Rubus saxicolus P.J.M. Cultivated (seed from Oxleas Wood, Eltham, West Kent), August 1933. Petals oval, pinkish, soon nearly white; stamens white, equalling or slightly exceeding the reddish-based styles; calyx segments patent in flower and for a time afterwards, at length clasping the fruit.—W. WATSON. "These specimens have some characters in common with *R. saxicolus* P.J.M. as indeed have a large number of other Rubi; but they do not agree with Müller's description, nor do they approach similarity to any of the examples of Müller's plant in Herb. Brit. Mus.—BARTON. "Comparison with Wirtgen Hb. Rub. Rhen., i, 151, and ii, 79, and a specimen of Honig's (1896) from the

Palatinate shows a different type of glandular development, prickle, leaf-clothing, etc. The present gathering is more Radulan than Koehlerian in type, notably in the panicle; impossible for *saxicolus*."—RIDDELSDELL.

Rubus exilis Joh. Lange in Fl. Dan., xvii (1883), p. 8. Between the Rudge and Lee, four miles south of Ross, Herefordshire, August 17, 1933. Occurs also on Shotover Hill, Oxfordshire, the plant there being thought at one time to be *R. Powellii*.—W. WATSON. "Mr Watson's specimens bear only a slight resemblance in some particulars to Lange's *exilis* as shown in his description and plate. It was obviously an abnormal form—'fructus quotannis abortivi inventi sunt'—and has been ignored by competent batologists."—BARTON.

Rubus spinulosus, var. *rivulariformis* Sud. Limekiln Wood, Crowborough, E. Sussex, August 1933. Petals white, small, oval; stamens white, equalling the greenish styles.—W. WATSON.

Rubus fruticetorum M. & L. Cultivated. (Seed from The Roughs, Newlands Corner, Surrey), August 1933. *R. adenoleucus* Chab., *R. prasinus* Focke, and *R. Friesii*, sub-sp. *venustus* Erichsen seem the same as this. Petals broadly ovate, pinkish to white; stamens white, slightly longer than the greenish styles; calyx segments clasping at first after flowering; stem epruinose, prickles very unequal, some curved; glands often white in the shade. Seen also at Netley Heath, Surrey, and at Half Moon Coppice, Midhurst, W. Sussex.—W. WATSON. "This plant corresponds to the original description of *R. fruticetorum* P.J.M. et L.V.L. (Versuch., No. 225) only in a few particulars, e.g., flowers. Stem armature, leaves, leaf surfaces, shape of terminal leaflet, panicle and calyx do not agree with the description. I have not seen an authentic specimen of *R. fruticetorum* M. & L., but there seems to be no justification for the use of the name in connection with the plant sent in for distribution."—BARTON.

Rubus hystrix Weihe? Hedge, Friday Wood Farm, Berechurch, N. Essex, v.-c. 19, July 10, 1933. Stamens exceeding styles, sepals patent in young flower, then rising and clasping.—G. C. BROWN. "*R. infecundus* Rog., a little off type in shape of terminal leaflet. *R. infecundus* does not seem to be identical with *R. rufescens* as shown in specimens of Müeller's authentication."—RIDDELSDELL and BARTON.

Rubus tereticaulis P.J.M. (teste Mr Wm. Watson). Hedge, Friday Wood Farm, Berechurch, Essex, v.-c. 19, July 10, 1933. Petals pink, stamens exceeding styles, sepals patent, then rising. Named *viridis* in 1924 by Rev. H. J. Riddelsdell and sent to the club under this name, but later named *tereticaulis* by Mr Watson in *Rep. B.E.C.* (Ref. No. 2107).—G. C. BROWN. "Not *tereticaulis*. A specimen of *R. tereticaulis* collected by Müller, July 26, 1858, from the *locus classicus* has the slender panicle branching of this gathering, but differs in important respects, e.g., the stem is subterete and has comparatively few prickles and also much shorter and scantier armature. It is doubtful whether the plant is *viridis* Kalt."—RIDDELSDELL and BARTON. "The specimen distributed to me was *Rubus serpens*, sub-sp. *angustifrons* Sud. I have not seen the rest of the specimens."—WATSON.

Rubus ?thyrsiflorus Weihe. Under shade, Denham Golf Course, Bucks, July 1, 1933. Petals white, clawed. (Ref. No. C.35).—J. CHAPPLE. "R. *pallidus* Whe. & N."—RIDDELSDELL.

Rubus dumetorum, var. *triangularis* A. Ley. Cultivated (seed from Sapey, Herefordshire), July 1933.—W. WATSON. "Apparently correct, though not quite typical in prickles."—RIDDELSDELL.

Rubus ——. (Ref. No. C.32.) Boar's Hill, Berks, June 23, 1933. —J. CHAPPLE. "Apparently the same form as Chapple's C.13 of 1932; the *scaber* of Boar's Hill. Material poor."—RIDDELSDELL. "Ref. No. C.32 J. Chapple is, in my opinion, *Rubus tereticaulis* P. J. Müll., *sensu lato* (probably sub-sp. *derasifolius* Sud.). It differs in the weak prickles, short stamens, and patent to erect sepals from *R. scaber*, which has stout-based hooked prickles, long stamens and sepals at first reflexed after flowering. In the more angled stem, the short pointed obovate terminal leaflet, and the pilose panicle rachis it differs from *Rubus tereticaulis* type. *Rubus conspectus* differs in its ovate terminal leaflet, longer stamens, longer and darker stalked glands and reflexed sepals. The Norfolk '*R. tereticaulis*' (see the *Handbook*) is, I think, best regarded as a form of *R. Menkei* in accordance with the opinion of Focke and Sudre."—WATSON.

Rubus ——. (Ref. No. C.33). Boar's Hill, Berks, June 23, 1933. —J. CHAPPLE. "Nearly identical with C.37, and probably the same form, *R. hystrix* W. & N., var. *bercheriensis*. The panicles cause no trouble; the stouter stem with broader and more developed leaflets perhaps accounting for a rather different look. It look as if the stem itself grew in shade."—RIDDELSDELL. "Ref. Nos. C.33 and C.37, J. Chapple, are *Rubus Koehleri*, sub-sp. *apricus* (Wimmer) (= *R. rosaceus*, var. *bercheriensis* Druce in Fl. Berks.)."—WATSON.

Rubus sp.? Crowborough, E. Sussex, August 1933. A frequent bramble around Tunbridge Wells, both in W. Kent and E. Sussex. Flowers rather small, petals pink. Stamens pink, about half as long as the greenish styles, the anthers of the longest stamens at length just reaching the stigmas of the outermost (and lowest) styles. Carpels pilose, fruit somewhat oblong. Stem glaucous. Leaves greyish-white beneath. Calyx segments patent to erect after flowering. I know no name for it.—W. WATSON.

Rubus ——. (Ref. No. C.36). Lambridge Wood, Henley, Oxon, July 9, 1933.—J. CHAPPLE. "The stem pieces seem to come from different plants, and the panicles certainly do. I have not separated the pieces."—H. J. RIDDELSDELL. "My apologies are due to Mr Chapple for inadvertently distributing this instead of returning it to him."—F. RILSTONE.

Rubus ——. (Ref. No. C.37). Boar's Hill, Berks, July 12, 1933.—J. CHAPPLE. "*R. hystrix* Wh. & N., var. *bercheriensis* Druce."—H. J. RIDDELSDELL.

Potentilla argentea L. Railway sidings, Newhaven, East Sussex, June 25, 1933.—J. E. LOUSLEY.

Rosa spinosissima L. × *rubiginosa* L. Coast between Dundee and Invergowrie, Angus, v.-c. 90, August 8, 1933. Near × *R. cantiana* W.-Dod, although the armature is not so abundant as it usually is in that hybrid.—R. and M. CORSTORPHINE. "The sheet sent to me shows no trace of *spinosissima* influence. I should label it *R. rubiginosa* L., var. *typica* W.-Dod, with petioles and leaflets almost glabrous. Even the midribs have but scanty pubescence, as happens on many specimens in my own herbarium. Also, styles are but weakly hispid. Some ill-formed fruit *may* suggest hybridity, in which rather unlikely event I should be inclined to suspect *R. micrantha* as the other parent, but that species is not recorded from v.c. 90."—BISHOP. "Since writing the above, it has come to my notice that the single sheet submitted to me (and through me to Col. Wolley-Dod) is untypical of the others. Sheets of the same gathering, submitted to Professor Matthews and to Col. Wolley-Dod, were pronounced by both to be a hybrid between *R. rubiginosa* and *R. spinosissima*. As Mrs Corstorphine is positive that all the specimens were collected from the same bush, this further emphasises the necessity for sending *all* the sheets of a gathering to the Referee."—BISHOP.

Rosa Andegavensis, var. *verticillacantha*, f. *clavicola* Rouy. Durnford Bridge, Ottershaw, Surrey, August 15, 1933. So it has been named, but my opinion is that the leaves are far too strongly glandular biserrate for any of the forms of *verticillacantha* I have hitherto seen.—W. BIDDISCOMBE. "Col. Wolley-Dod has said this 'will do quite well as f. *clivicola*.' The very strong biserration and general 'glandulosity' led me rather to expect subfoliar glands, but even the microscope reveals none. Re Mr Biddiscombe's objection, Keller makes *verticillacantha* (Mér.) Baker a large and variable aggregate, with forms of various degrees of biserration and size of leaflets. But he puts f. *clivicola* under var. *Schottiana* Ser. I can only follow Col. Wolley-Dod and call this *R. canina* L., var. *verticillacantha* (Mér.) Baker, f. *clivicola* Rouy."—BISHOP.

Rosa canina, Group *Andegavenses*, var. *Pouzini* (Tratt.), f. *anglica* Dingl. Dolley's Farm, Horsell, Surrey, July 23, 1933. This has been confirmed by Col. Wolley-Dod in spite of its hispid styles. See *B.E.C.*

Report, 102, 1932. I believe Keller has a var. of *Pouzini* which fits it better, and has slightly hispid styles, but ovoid fruits, which is more characteristic of *Pouzini* type.—W. BIDDISCOMBE. "Re Mr Biddiscombe's last sentence, Keller regards *Pouzini* (Tratt.) Rouy as a subspecies of *R. canina* L., having equal status with *R. vulgaris* Gams (practically equivalent to *R. canina* L. of most British botanists) and *R. dumetorum* Thuill. He describes *R. Pouzini*, var. *typica* Burnat et Gremli, as having ' . . . *styli glabri vel disperse pilosi: receptacula fructifera ovata.*' There is a f. *porrecta* of this var., which differs from *typica* in the following (and other) respects: ' . . . *foliolis* . . *longe cuspidatis, pedunculis partim nudis, partim parce glandulosis.*' Neither styles nor fruit of this f. are described, so presumably they are as in var. *typica*. Perhaps *porrecta* is the one to which Mr Biddiscombe refers, and *prima facie* it does seem a good fit for his Rose, except that the latter has much more densely hispid styles. But, until Col. Wolley-Dod is satisfied that typical *Pouzini* is native in Britain, we must leave this Rose as he has decided, and call it *Rosa canina* L. (var. *Pouzini* (Tratt.) W.-Dod), f. *anglica* Dingl., with hispid styles."—BISHOP.

Rosa dumetorum Thuill., var. *typica* W.-Dod, f. *semiglabra* (Rip.) W.-Dod. (Ref. No. 4903). (*Fide* A. H. Wolley-Dod, who saw other specimens of 4903 from the same plant.) North side of Kirk Burn, Bre, Hoy, Orkney, October 4, 1933. . . . in unripe fruit and sparingly in ripe fruit. Leaves thinly pubescent or subglabrous above, . . . more densely pubescent beneath, especially on the midribs and principal veins; petioles densely pubescent, . . . —H. H. JOHNSTON. "On the (late-gathered) specimen before me, pubescence occasionally spreads a little beyond midribs to principal nerves. Similar Roses of mine have been passed by Col. Wolley-Dod as *semiglabra*, and consequently I have done likewise. But the description on label here goes far beyond. In my opinion any such Rose with leaflets thinly pubescent *above* should come under f. *urbica* (Lem.) W.-Dod. I should like to have seen the earlier-gathered specimens in this case."—BISHOP.

Rosa dumetorum, Group *Deseglisei*, var. *incerta* Déségl. Scotehers Farm, Horsell, Woking, Surrey, August 3, 1933. An interesting feature of this is the extension of the glandular development of the peduncles to the base, and sometimes as far as the middle, of the fruit. —W. BIDDISCOMBE. "A good proportion of leaflets are (at least) weakly pubescent above, whilst below pubescence often extends beyond midribs and nerves. Following upon descriptions by Wolley-Dod and Keller, I prefer to call this *R. dumetorum* Thuill., var. *Deseglisei* (Bor.) Chr. The presence of glands on fruit seems rare in Group *Deseglisei*. I have looked through all the sheets in my herbarium and found only one such, a specimen of f. *laevistyla* from South Harting, West Sussex."—BISHOP.

Rosa Afzeliana Fr., var. *Reuteri* (Godet) Wolley-Dod. (Ref. No. 4896). (*Fide* A. H. Wolley-Dod, who saw other specimens from the same plant.) Burn of Segal, Hoy, Orkney, September 29, 1933.—H. H. JOHNSTON. "Yes, but specimen received by me is very poor and much defoliated."—BISHOP. "I agree with the determination. I have no such ripe fruits from the Highlands as the sepals of mine are still fast and erect."—FRASER.

Rosa Afzeliana Fr., var. *Reuteri* (Godet) W.-Dod, f. *transiens* (Kern.) Gren. (Ref. No. 4899). Bank of Burn of Berriedale, Hoy, Orkney, September 29, 1933 (*fide* A. H. Wolley-Dod, who saw other specimens from the same plant).—H. H. JOHNSTON. "On specimen sent to me leaflets are what I call biserrate, some weakly so, but some quite strongly. It seemed to me nearer f. *adenophora* than f. *transiens*, so I submitted it to Col. Wolley-Dod, who replied, 'I agree that this specimen is at least equally near *R. Afzeliana*, var. *glaucophylla* (Winch) f. *adenophora* Gren. The biserration is slight and may vary in different parts of the bush, but I have no specimen from the original gathering to compare with.—A. H. W.-D.' As for a year or so I have borrowed Keller's *Synopsis* from Col. Wolley-Dod, and so deprived him of the invaluable benefit of that *magnum opus*, he asked me to see whether Keller describes any var. or f. fitting to this case, particularly in the irregularly-serrate Group B. (Transitoriae). In that Group, under Section with glandular peduncles and leaflets without subfoliar glands, I do find a form which seems a fairly good fit. If Col. Johnston cares to use the name of f. *hispidula* Rouy for his plant, as being about halfway between *transiens* and *adenophora*, I have permission from Col. Wolley-Dod to pass it (provisionally) as that form. I must point out that Keller divides *R. Afzeliana* Fr. into six sub-species, two of which are *R. vosagiaca* Desportes and *R. subcanina* Hayek, corresponding respectively to Wolley-Dod's Groups *Reuterianae* and *Subcaninae*. Under Keller's nomenclature, the Rose we are now discussing would be called *R. vosagiaca* Desportes, var. *hispido-caballicensis* Rob. Keller, f. *hispidula* Rouy."—BISHOP.

Rosa Afzeliana Fr., var. *subcanina* Chr. (Ref. Nos. 4900 and 4901, two distinct bushes from same station) (*fide* A. H. Wolley-Dod, who, in each case, saw specimens from the same plant). South side of Kirk Burn, Bre, Hoy, Orkney, October 2, 1933.—H. H. JOHNSTON. "Yes."—BISHOP.

Rosa Afzeliana Fr., var. *denticulata* R. Kell., f. *subcomplicata* Hayek. (Ref. No. 4902) (*fide* A. H. Wolley-Dod, who saw specimens from same plant). North side of Kirk Burn, Bre, Hoy, Orkney, October 2, 1933.—H. H. JOHNSTON. "Yes."—BISHOP.

Rosa Afzeliana Fr., var. *pseudo-Haberiana* R. Kell. (Ref. No. 4889) (*fide* A. H. Wolley-Dod, who saw specimens from the same plant). South Burn, Hoy, Orkney, September 28, 1933.—H. H. JOHNSTON. "Yes."—BISHOP.

Rosa villosa L., var. *mollis* Sm. × *Sherardi* Davies (= *Rosa mollis* Sm. × *omissa* Déségl.) (*fide* A. H. Wolley-Dod, who saw this specimen). Bre, Bay of Creekland, Hoy, Orkney, October 6, 1933. Specimen from the same station as James Sinclair's Ref. Nos. 588 and 627, and my Ref. Nos. 4116, 4294, etc.—H. H. JOHNSTON. "Of course, it is not for me to venture to criticise a diagnosis such as this from Col. Wolley-Dod. I presume that we have here his ×*R. Shoolbredi*, vide 'Revision,' 77."—BISHOP.

Saxifraga hypnoides L. × *sponhemica* Gmel. About the Devil's Kitchen, Cwm Idwal, Carnarvonshire, June 1931. The complexity of the variations of the "Mossy" Saxifrages in Cwm Idwal is well-known, and is probably explained by the theory that ancient hybrids have recrossed among themselves and backcrossed with the original parents. This state of affairs is probably further complicated by ecological considerations as plants growing in the moss of the watercourses have a looser habit and larger thinner leaves as contrasted with the caespitose growth and smaller tougher leaves of those on the drier parts of the scree. The few specimens now sent for distribution all come from different plants, and are not intended to be homogeneous, but it is thought that they all fairly represent intermediates between the putative parents.—J. E. LOUSLEY.

Sedum dasyphyllum L. Old walls, Marcham, Berks. June 1933.—J. CHAPPLE. "Correct; the typical form of the species."—FRASER.

Callitriche truncata Guss. Stream at Chipstead, near Sevenoaks, West Kent, August 26, 1933. (Ref. No. E.1). These specimens are from the stream which later becomes the River Darent, in which the species was discovered by C. E. Smith in 1837. I have several times searched the upper part of the stream near Westerham (whence Smith recorded it) without success and H. & J. Groves had the same experience (*Rep. B.E.C.*, 30, 1905), though I now know the plant both east and west of Chipstead in some plenty. No flowers or fruits were found. —J. E. LOUSLEY. "*C. truncata* Guss., var. *occidentalis* Rouy."—PEARSALL.

Epilobium parviflorum Schreb. Hanslope, Bucks, 1926, leg. G. C. Druce, comm. J. CHAPPLE. "Correct. The dense pubescence or tomentum on the underside of the leaves indicates that these specimens have been growing in a very dry situation."—FRASER.

Epilobium sp. Powderham, S. Devon, July 25, 1933.—R. J. BURDON.

Œnothera odorata Jacq. Sandy ground, St Helens, Isle of Wight, July 1, 1933.—H. FOSTER. "Correct. The yellow flowers turn red when dried. It seems a new station for this S. American species."—FRASER.

Circaea lutetiana L. Kewstoke Wood, Weston-super-Mare, Somersetshire, June 9, 1933.—C. WATERFALL.

Citrullus vulgaris L. Adventive. Waste ground, Dagenham, Essex, September 23, 1933. The Water Melon. There was a large patch of this when I visited the waste ground at Dagenham this year. Probably the dry, hot summer favoured its growth. Several fruits reached a size of about 5 ins. diameter, and the fruit sections were, most of them, taken from one of this size. The sections were about ½ inch thick when fresh and shrank considerably during drying.—R. MELVILLE.

Bupleurum tenuissimum L. Sandy turf on coast of Pevensey Bay near the coastguard station at Norman's Bay, East Sussex, v.-c. 14, October 12, 1905, leg. C. Bailey, comm. J. CHAPPLE.

Tordylium maximum L. Cultivated. Newport, Isle of Wight, July-September 1933.—J. W. LONG.

Oenanthe pimpinelloides L. Yarmouth, Isle of Wight, June 28, 1933.—H. FOSTER. "The radical leaves of the above species are not so much cut up as the specimen I have got. Rather, they are more like the leaves of *Pimpinella Saxifraga*. That I have received is *Œ. Lachenalii* C. Gmel., also a maritime species."—FRASER.

Galium dumetorum Jord. Warlingham, Surrey, July 12, 1933. (Ref. No. 4091).—C. E. BRITTON. Later: "Further study of this Bedstraw has induced me to abandon the name applied to it, and to substitute *G. nemorosum* Wierzbicki. Will recipients please correct?"—C. E. BRITTON.

Galium erectum Huds. Dry bank, Brean Down, Somerset, v.-c. 6, June 27, 1933.—C. WATERFALL. "Not *G. erectum* Huds., but small glabrous and hairy forms of *G. Mollugo* L."—BRITTON.

Galium erectum × *verum*. Roadside on gravel, Stanway, N. Essex, July 11, 1933. Sent in 1913. Cf. *Rep. B.E.C.*, 471, 1913.—G. C. BROWN. "The two examples received strongly resemble *G. verum* in habit, and in the characters of stems, leaves, and flowers, and do not indicate affinity with *G. erectum*. A point, however, in which they differ from *G. verum* is a tendency of some of the branches of the panicle to at first spread widely before becoming erect, a feature that is not characteristic of *G. verum* nor of *G. erectum*. I am doubtful of the latter entering into these plants and am of the opinion that they are not identical with examples of the hybrid distributed by Mr Brown in 1913. A series of the plant might prove convincing, but, as to the specimens received, I believe that they must go to *G. verum* L."—BRITTON.

Galium erectum × *verum*. Rough pasture, Edzell Golf Course, Angus, v.-c. 90, July 23, 1932.—R. and M. CORSTORPHINE. "Correctly named. The plants received display the closest affinities with *G. erectum*, differing in the narrower and more elongated leaves, the larger more compact inflorescence, the smaller and shorter-pedicelled flowers (yellowish?); characters which indicate the influence of *G. verum*."—C. E. BRITTON. "Shows in its broadest leaves, in the length of each separate panicle, and in the nearly erect peduncle the influence of *G. erectum*. The narrow leaves, and their closely revolute margin whether linear or narrowly linear, and in the less or not aristate lobes of the corolla the influence of *G. verum*."—FRASER. "Much more clearly intermediate examples than Mr G. C. Brown's from Essex. The latter are nearer the *verum* parent."—E. C. WALLACE.

Galium verum L., var. *maritimum* DC. Sand dunes at edge of Golf Links, Weston-super-Mare, Somersetshire, June 21, 1933.—C. WATERFALL.

Galium tricorne Stokes. Waste land, Newport, Isle of Wight, July 1932.—J. W. LONG. "Correct. Not a common species."—FRASER. "Very robust and luxuriant specimens. I notice that the inflorescence is proportionately long but not longer than the leaves."—E. C. WALLACE.

Matricaria Chamomilla L. (Ref. No. 4875). Grassy, gravelly, waste ground near a wooden poultry house, 160 feet above sea-level, Hamar House, Stromness, Mainland, Orkney, September 6. 1933. Introduced with poultry food; a new record for this species for v.-c. 111.—H. H. JOHNSTON. "Correct. It is surprising that this species has not previously found its way to Orkney seeing that the rayless *M. suaveolens* Buchenau has reached the north end of the Shetland Islands according to the late Dr Druce."—FRASER.

Matricaria sp.? Railway bank, near Beeston, Notts, July 18, 1933.—R. BULLEY. "*Matricaria inodora* L., flore pleno Hort. A garden escape in cultivation in 1881 and previously. It is propagated by seeds."—FRASER.

Artemisia Absinthium L. Waste ground, Newton by Chester, v.-c. 58, August 25. 1933.—C. WATERFALL. "Yes; the ordinary Wormwood."—FRASER.

Artemisia maritima L., var. *gallica* Willd. Aberthaw, Glamorgan.—E. VACHELL. "Quite correct for this variety, the branches and capitula being erect."—FRASER.

Senecio Jacobaea L., var. *discoideus* L. Shell-sandy, grassy pasture at seashore, near North Jetty, Copinsay, Orkney, August 5, 1933. (Ref. No. 4816). Plant in full bloom without ray florets; growing among *S. Jacobaea* L. with large or small ray florets in different plants.—H. H. JOHNSTON. "I agree. According to Linnaeus it is or was frequent on the Belgian dunes, and, of course, in sand."—FRASER.

Cirsium arvense (L.) Scop., var. *incanum* Ledeb. Kirkstall, W. Yorks, August 24, 1933.—H. **Foster.**

Centaurea sp. Newton Abbot, South Devon, July 22, 1933.—R. J. **Burdon.** " *C. nemoralis* Jord."—**Britton.** " I think this is *C. nemoralis* Jord. Some of the appendages of the lower phyllaries are subulate, most of the others are ovate."—**Fraser.**

Centaurea Solstitialis L. Lucerne field, Woodcote, near Wallington, Surrey, v.-c. 17, August 1933.—F. L. **Still** and E. C. **Wallace.** Records from this locality date back for many years.—E.C.W. " Excellently prepared examples showing the pinnatipartite basal and lower stem-leaves. *C. Solstitialis* L., as a native plant, extends from south and east Europe into Asia Minor. In central and western Europe it is an introduced plant in fields where lucerne (*Medicago sativa*) is cultivated and in Britain does not appear to be anywhere permanently established."—**Britton.** " I agree. It has been introduced with lucerne no doubt."—**Fraser.**

Hieracium dumosum Jord. Adel, West Yorks, August 31, 1933.—H. **Foster.** " One of the segregates of *H. boreale* Fr."—**Pugsley.**

Hieracium virgultorum Jord. Armley, West Yorks, August 28, 1933.—H. **Foster.** " Perhaps rightly named, but I am at present unable to identify satisfactorily the segregates of *H. boreale* Fr."—**Pugsley.**

Hieracium sp. Leonard Stanley, Gloucestershire, July 8, 1933.—R. J. **Burdon.** " One of the forms formerly referred to *H. sciaphilum* Uechtr.: probably shade-grown *H. chlorophyllum* Jord."—**Pugsley.**

Oxycoccus quadripetala Gilib. Two varieties, (a) red fruits, (b) " speckled " fruits. Bog on Oakhanger Common, North Hants, September 1, 1933. I was shown these two fruiting varieties by Lady Davy who has known them both at this locality for some years. The fruits of (a) are a rich red on one side, and are longer than they are broad. Those of (b) are larger, broader than they are long and uniformly covered with *dark* red speckles. The two varieties each have their own area in the bog, never occur on the same plant, and are clearly not dependent on light or maturity. The colouring is of an entirely different shade apart from its distribution on the fruit, and the speckled fruits taste far more astringent and are less palatable than those of the " red " variety. The " red " fruits appear to be the common form in this country—the " speckled " are entirely new to me. It is obviously impossible to preserve the shape or colouring of the fruits in dried specimens and " air " drying has proved equally unsuccessful.—J. E. **Lousley.**

Centaurium umbellatum Gil., var. *capitatum* (Koch). Near Logan Rock, W. Cornwall, August 1931, leg. G. C. Druce.—J. **Chapple.**

Myosotis palustris Hill, var. *strigulosa* (Reichb.). Atwick, Yorkshire, August 20, 1933.—R. Bulley. "This is *M. caespitosa* Schultz. It is advisable when collecting species of *Myosotis* to gather entire plants."—Wade.

Myosotis repens G. & D. Don. Ditch on Bisley Common, Surrey, v.-c. 17, July 5, 1933.—E. C. Wallace. "Correct."—Wade.

Myosotis sylvatica Hoffm. Skeffington Wood, Leicestershire, May 1933, (Ref. No. 1408).—F. A. Sowter. "Correct."—Wade.

Volvulus Soldanella Junger. Sand dunes at edge of Golf Links, Weston-super-Mare, Somersetshire, June 20, 1933.—C. Waterfall.

Lycium chinense Mill. Large bush at edge of Golf Links, Weston-super-Mare, Somersetshire, June 21, 1933.—C. Waterfall.

Hyoscyamus muticus L. Adventive. Waste ground, Dagenham, Essex, September 23, 1933. This and *Citrullus vulgaris* were both dried in a vacuum oven at 70° C. and at a pressure of 20 mm. (1/38th atmosphere). *H. muticus* has fleshy leaves about 2 mm. thick and is a difficult plant to dry by ordinary means. All the specimens were obtained from one plant which was the second I have seen as an alien in this country. —R. Melville.

Veronica agrestis L. Grassy waste ground near a wooden poultry house, 160 ft. above sea-level, Hamar House, Stromness, Mainland, Orkney, September 6, 1933. (Ref. No. 4873). Leaves green above, paler green beneath. Peduncles, pedicels, and unripe fruit copiously clothed with straight gland-tipped hairs. Corolla small with a pale blue limb with deeply blue lines and a very short pale yellow tube.—H. H. Johnston. "Correct. Capsules with erect glandular hairs only = var. *Garckiana* Fourn."—Britton. "I agree. In southern counties it is mostly met with in allotment grounds and gardens."—Fraser.

Euphrasia sp. Hornsey, Yorks, August 17, 1933.—R. Bulley. "Robust *E. nemorosa*."—W. H. Pearsall. "The specimens from Hornsea, Yorks, are *E. nemorosa* Löhr, var. *ciliata* Drabble."—Fraser. "Badly selected and dried specimens; a form of *E. nemorosa* Löhr."—Pugsley.

Euphrasia micrantha Reichb., approaching f. *simplex* Pugsley (*fide* H. W. Pugsley, November 4, 1933). (Ref. No. 4831). Moist natural grassy, heathery, rushy and sedgy pasture, 190 ft. above sea-level, between Orgill Cottage and the base of the north-east side of the Ward Hill, Hoy, Orkney, August 16, 1933.—H. H. Johnston.

Euphrasia micrantha Reichb., f. *simplex* Pugsley (*fide* H. W. Pugsley, November 4, 1933). Moist natural pasture on hillside, 300 ft. above sea-level, north side of Ward Hill, Hoy, Orkney. Ref. No.

4745—plants in full flower, July 11, 1933, and Ref. Nos. 4849 and 4850—plants in flower and unripe fruit (sparingly in ripe fruit), August 22, 1933.—H. H. JOHNSTON. "All three are different forms of *E. micrantha* Reichb.—the variations being mainly due to the relative dryness or wetness of the respective habitats."—PEARSALL. "Ref. No. 4745, correct; Ref. No. 4849 correct, some specimens nibbled and consequently branched; Ref. No. 4850 correct, one of the specimens of my sheet nibbled and consequently branched."—PUGSLEY.

Mentha longifolia (Opiz) Fraser, var. *dourensis* Fraser. Cult. Kew from the Dour, New Aberdour, Aberdeenshire. Differing from the type in having longer and more slender interrupted spikes of purple (not pale pink) flowers. The Dour is a rocky stream, and simply means water in the language of the ancient Welsh Celts. The present race of people make it a proper name.—J. FRASER.

Mentha longifolia × *rotundifolia*. (Ref. No. 1790.) Hedgebank near Hook Station, North Hampshire, v.-c. 12, September 9, 1933.—E. C. WALLACE. "The leaves are not broad enough for any of the hybrids of the above parents. It is simply *M. longifolia* Huds."—FRASER.

Mentha spicata L. (*viridis* L.). (Ref. No. 1794). Shalford Common, Surrey, v.-c. 17, September 2, 1933.—E. C. WALLACE. "Correct by the name I have adopted. Linnaeus mixed up three species as varieties of *M. spicata* and finally adopted *M. viridis*, and under this name it appears in the third edition of his *Species Plantarum*. If the oldest name is adopted it would be advisable to write *M. spicata* L. (*M. viridis* L.) seeing that many botanists adopt *M. viridis* L. The specimens gathered by E. C. Wallace have suffered from the drought of last summer and have been attacked by rust (*Puccinia menthae*) as usual."—FRASER.

Mentha gracilis Sm., var. *cardiaca* (Baker). (Ref. No. 1796). Near pond on Shalford Common, Surrey, v.-c. 17, September 2, 1933.—E. C. WALLACE. "Correct by the *London Catalogue*, 11th ed., but a hairy state of it. I follow the late Jean Briquet in writing the name × *Mentha gentilis* (L.), var. *cardiaca* (Baker) Briq. This may seem cumbrous, but it gives indication of its hybridity, the accredited parentage being *M. arvensis* × *gentilis*. It is functionally only ♀ and cannot reproduce itself by seeds."—FRASER.

Mentha gracilis, var. *variegata* (Sole) Sm. Garden, Nottingham.—R. BULLEY. "There must be some mistake in quoting me as having determined this as a variety of *M. gracilis*. I have known it in gardens as *M. gentilis variegata* since 1874, and this has been confirmed by Briquet much more recently. In botanical form the name is × *M. gentilis* (L.), var. *variegata* (Sole) Sm. The late Dr Druce's List contains the synonym *Hackenbruchii* instead of *variegata*."—FRASER.

Mentha cardiaca Baker. Shalford Pond, Surrey, September 5, 1933. —R. J. BURDON. "This is *M. cardiaca* Baker, but that author laid very little stress, if any, on the hybridisation of mints in a state of nature. It is *M. gentilis* (L.), var. *cardiaca* (Baker) Briq. It is a very hairy state of the hybrid, for it is one of the hybrids which sport, giving forms or states different from the type."—FRASER.

Mentha citrata Ehrh. Near Chiddingfold, Surrey, September 14, 1933. (Ref. No. E.6). Shown to me by Mr E. C. Wallace.—J. E. LOUSLEY. "A typical *M. citrata* Ehrh., being glabrous even to the calyx teeth, and bracteoles. The Potter's Bar specimens, distributed many years ago, have a few hairs on the stem and leaves, and short cilia on the bracteoles and the calyx teeth."—FRASER.

Mentha rubra Sm., var. *raripila* Briq. (Ref. No. 1804). Roadside ditch near Newdigate, Surrey, v.-c. 17, September 6, 1933.—E. C. WALLACE. "Not the variety *raripila* Briq., but the common or typical form of the hybrid × *M. rubra* (Sm.). The hairs on the leaves, stems, nodes, and petioles are very few, and the floral bracts are subrotund and cuspidate. The variety *raripila* Briq. is much more hairy on the parts named, and the floral bracts are ovate and gradually narrowed to the acute apex. It is fairly common on the northern half of Holmwood Common, near Dorking."—FRASER.

Mentha arvensis L., var. *densifoliata* Briq. Colwick, Nottinghamshire.—R. BULLEY. "Correct; but the specimen is not in its best form owing to the dry summer. The most distinctive leaves are those on the main axis, but most of them have fallen."—FRASER.

Mentha ——? Shalford Pond, Surrey, September 7, 1933.—R. J. BURDON. "This is *Mentha spicata* L. (*M. viridis* L.), for Linnaeus included three species as varieties under *M. spicata*, and afterwards changed this one to *M. viridis*. It is the spearmint of gardens in a very depauperated state, owing to drought and rust (*Puccinia menthae*). Several research stations are trying to find a substitute for it for garden purposes."—FRASER.

Stachys officinalis Trevis (=*Betonica officinalis* L.). Hedge bank near Rhyd-y-newyn, Flintshire, N. Wales, July 19, 1933.—C. WATERFALL.

Lamium Galeobdolon Cr. Woldingham, Surrey, May 11, 1933. (Ref. No. 4070). In *Journ. Bot.*, 327, 1926, attention was drawn to the occurrence of two forms of *L. Galeobdolon* and the distinguishing characters enumerated. The form now distributed is not the common representative of the species (var. *montanum*) but is related to var. *genuinum*, from which it differs by the short appressed hairs on the calyx and on the stem between the floral whorls. These are the distinctions of var. *puberulum* Beck.—C. E. BRITTON. "I agree."—FRASER.

Teucrium Scordium L. Braunton Burrows, N. Devon, v.-c. 4, September 2, 1915, coll. W. A. Shoolbred; comm. Dept. of Bot., National Museum of Wales, per H. A. HYDE.

Amaranthus blitoides S. Wats. Waste ground, Penarth Road, Cardiff, Glamorgan, September 29, 1933, coll. A. E. Wade; comm. Dept. of Bot., National Museum of Wales, per H. A. HYDE.

Chenopodium urbicum L., var. *intermedium* Moq. Edge of stream, Aberthaw, Glamorgan.—E. VACHELL. "I agree. The teeth of the leaves are certainly large and deep, agreeing with the variety."—FRASER. "Very welcome specimens in fine fruit."—LOUSLEY.

Chenopodium sp.? River side, Newport, Isle of Wight, August-October 1932. Inflorescence leafy throughout. In *C. glaucum* "spikes short, dense, leafless."—J. W. LONG. "An interesting state of *C. glaucum*, var. *microphyllum* of Hooker, Cosson & Germain, and Murr which, however, is generally a small, prostrate plant. Are Mr Long's specimens secondary growths after mutilation? Many specimens of *C. glaucum* have the inflorescence somewhat leafy (cf. lower left hand branches in plate 170 of *Camb. Brit. Flora*), but these are the most extreme I can trace. Watson's plant from St Sampson's, Guernsey, described as having interrupted spikes (*Rep. B.E.C.*, 34, 1872/4; and *Journ. Bot.*, xiii, 345, 1875) is shown by specimens in Herb. Brit. Mus. to be a very different plant with large almost entire leaves."—LOUSLEY. "This agrees with so many specimens in the herbarium as *C. glaucum* L., that I do not see why it should not be so labelled."—WILMOTT.

Beta maritima L. Sand dunes, edge of Golf Course, Weston-super-Mare, Somersetshire, June 21, 1933.—C. WATERFALL.

Polygonum dumetorum L. Near Compton, Surrey, August 31, 1933. —R. J. BURDON. "Quite correct."—FRASER.

Polygonum sp. Football field, Newport, Isle of Wight, June 1932. Well marked by long pedicelled flowers. Ripe fruit not obtainable.—J. W. LONG. "*P. Bellardi* All. Mr A. J. Wilmott agrees to this identification."—BRITTON. "*Polygonum pulchellum* Lois.—a native of maritime sands in the Mediterranean region."—LOUSLEY.

Polygonum lapathifolium L., var. *angustifolium* Peterm. Hort. Warlingham, Surrey, Ref. No. 4117, August 16, 1933. Cultivated from seed. It will be seen that the varietal character is inherited. The white flowers are not peculiar to this variety.—C. E. BRITTON. "I agree. A white-flowered form with narrow leaves."—FRASER.

Polygonum nodosum Pers., var. *inundatum* C. E. Britton. Bed of dried-up pond on Dunsfold Green, Surrey, August 23, 1933. Plants mostly prostrate but some ascending or straggling over the rough foot-marked bed of the pond.—E. C. WALLACE. "I agree."—BRITTON. "Evidently right as to the variety. The prostrate form has not previously come under my notice."—FRASER.

Rumex sanguineus L. (Seedlings.) Original plant from Lymm, Cheshire, May 19, 1929.—C. WATERFALL.

Rumex palustris Sm. (Ref. No. 10). Near Mitcham Junction Station, Surrey, September 12, 1933. This locality was described to me by Messrs A. H. Carter and H. S. Redgrove who brought me fresh specimens for confirmation. This species has been recorded for Mitcham by Trimen, but I have not previously met with it although I have been in this and other gravel pits in the neighbourhood on numerous occasions in the past few years. The hybrid with *Rumex obtusifolius*, sub-sp. *agrestis*, also occurred (confirmed by Rechinger). The fact that careful search both here and at Southerham (near Lewes), this year, has failed to reveal any *R. maritimus* is additional evidence that *palustris* is not itself a hybrid between that species and *conglomeratus*, as is sometimes supposed. Hundreds of absolutely uniform plants were examined.—J. E. LOUSLEY. "I agree that this dock is the *R. palustris* Sm. because it has a greener aspect in the early stages than *R. maritimus*, and in the whorls of flowers being distant at first and only assuming a crowded condition when the fruit is reaching maturity. The bristles on the edge of the perianth segments are mostly only two on each side. L'Abbé Coste thinks it is a hybrid between *R. conglomeratus* and *R. maritimus* because it behaves like a hybrid. The *Index Kewensis* refers *R. limosus* Thuill. to *R. palustris* Sm."—FRASER.

Ulmus elegantissima Horwood. Owston, East Leicestershire, April 1933.—F. A. SOWTER. "My sheet agrees fairly well but not entirely with the diagnosis of this new species in Horwood's *Flora of Leicestershire*, 482, 1933. The diagnosis includes the following:—'foliis minoribus angustioribus sub-cordatis et subaequalibus ad basim subglabris;' 'ad basim' refers presumably to the preceding 'subaequalibus' and not to 'subglabris.' The leaves in my specimen are certainly small and narrow but they are not subequal at the base; in the case of the fully-developed leaves they are very unequal at the base and only in the smallest and least-developed is there any indication of subequality. The plate accompanying the description shows all the leaves equal at the base."—HALL.

Ulmus sp.? Small tree, Hornsea Mere, Yorks, August 17, 1933.—R. BULLEY. "The small-leaved elm, *U. minor* Mill. It was first described by Goodyer in 1633, in Johnson's edition of *Gerard's Herbal*, 1480. I have not seen it previously from this northern locality."—FRASER.

Parietaria ramiflora Moench. Old walls near Banwell, Somersetshire, June 19, 1933.—C. WATERFALL.

? *Populus Eugenei* Simon-Louis. Lambourne Hill, West Cornwall, August 1933. An interesting letter to "The Times" about two years ago over the names of Dr J. Burtt Davy and Mr W. R. Day of the Imperial Forestry Institute, Oxford, called attention to the fact that "Black Italian" poplars as planted in this country are of four varieties (*serotina*, *Eugenei*, *marilandica* and *regenerata*) with varying characteristics, one being especially subject to canker while another is apt to be dangerous through the brittleness of the branches. In the absence of catkins (which I have never seen on these trees) the specimens I sent to the Imperial Forestry Institute were not definitely named, and the name *Eugenei* was only tentatively suggested. The trees are very subject to attack by the leaf disease fungus, *Taphrina aurea*, the spots of which can be seen on the older leaves.—F. RILSTONE. "Judging by the small size of the leaves, their shallow serratures, the erect branches, the pale yellowish-white bark and the glabrous condition of all parts this is *Populus italica* Moench (Lombardy Poplar). As I have seen *P. Eugenei* growing it is a narrow, tall-growing tree but the branches are not strictly erect."—FRASER.

Salix pentandra L. (Ref. No. 1836). By the Wey near Elstead, Surrey, v.-c. 17, May 28, 1933, and September 3, 1933.—E. C. WALLACE. "Correct. It is very variable in the length and breadth of the leaves, but many of the bushes or trees are not constant. The leaves get very small on old trees. There is a narrow-leaved variety in the country."—FRASER.

Salix pentandra L., var. *latifolia* Anderss. (Ref. No. 676). Cult. Kew from Esher Common, Surrey, May 31 and August 21, 1933. This was recorded by H. C. Watson in Brewer's *Flora of Surrey*, dated 1863, but the ground is now enclosed with a house. The leaves can be considerably larger but my bush is only six feet high.—J. FRASER.

Salix triandra L., var. *discolor* Anderss., f. *latifolia* Anderss. (Ref. No. 543). Large pond by the River Wey, Weybridge, Surrey, April 9 and October 15, 1933. This is the broadest-leaved form of the species and the leaves can get broader on vigorous young bushes.—J. FRASER.

Salix alba × *fragilis*. (Ref. No. 1837). Lane near Nutfield, Surrey, v.-c. 17, April 14 and July 15, 1933. "*Salix alba* × *fragilis*, f. *monstrosa*. This is what Dr Floderus of Stockholm called it, but many other names have been given it. No doubt it is a planted tree from Kent to the Moray Firth." J. Fraser, November 1933.—E. C. WALLACE. "Correctly named so far as given, but it is not the common form of the hybrid known as *S. viridis* Fries. In 1932, Björn Floderus, of Stockholm, who has studied the world's willows for 51 years, named some sheets of it for me, and wrote *S. alba* × *fragilis*, f. *monstrosa*. It is a planted tree from Kent and Sussex to the shores of the Moray Firth. Several botanists have given it different names, including *S. alba* × *fragilis*, f. *excelsior* Host, and this would seem to be the oldest name.

The other names I dismiss. The catkins are much stouter and far more hairy than those of *S. fragilis*, while there are hundreds of forked catkins on large trees, so that the name given by Dr Floderus is at least appropriate, if not the oldest."—FRASER.

Salix purpurea × *viminalis*, f. *Eugeni* Fraser. (Ref. No. 732). Cult. Kew from Westonbirt, Tetbury, Gloucester. Bush in the garden erect, 10 feet high. The long narrow leaves, drying green, and densely pubescent while unfolding and quickly glabrescent come from the *S. viminalis* parent. It is the *S. purpurea* L., var. *Helix* Koch, but is altogether different from *S. Helix* Sm.—J. FRASER.

Salix sp.—R. BULLEY. *Salix atrocinerea* × *aurita* (*S. Charrieri* Chass.). This natural hybrid took place in France, where *S. atrocinerea* is a scarce member of that country, and was named in the *Bulletin de la Société Dendrologique de France* for November 15, 1931, by Dr Chassagne, R. Gorz participating in some of the records for hybrids in France.—J. FRASER.

Hydrilla verticillata (L. f.) Presl, var. *pomeranica* (Reichb.). Esthwaite Water, North Lancs, v.-c. 69, August 3, 1933.—W. A. SLEDGE. "Nineteen years have elapsed since this was first discovered and distributed. This is a sufficiently long interval to warrant a further distribution of this beautiful species, which members will be pleased to see. It is gratifying to know that it still flourishes so plentifully in Esthwaite Water and we are greatly indebted to Dr Sledge for its presentation in so perfect a form."—PEARSALL. "My specimen from Esthwaite Water dated 4/8/1920 is simply named *H. verticillata* Casp., and so far I have been unable to detect the difference from var. *pomeranica*. Both have 2-5 (average 4) subulate, very acute, faintly lined, pale green sub-translucent leaves and branching stems."—FRASER.

Allium Scorodoprasum L. Austwick, West Yorks, v.-c. 64, July 8, 1933.—W. A. SLEDGE. "Correct. The Sand Leek or Rocambole."—FRASER.

Fritillaria Meleagris L. Damp field, Minety, v.-c. 7, April 19, 1933. —J. D. GROSE.

Narthecium ossifragum Huds. Matley Bog, New Forest, v.-c. 11, July 4, 1933.—I. HELSBY. "I agree; the yellow, dense pubescence on the filaments is unmistakable."—FRASER.

Luzula Forsteri × *pilosa* (*Borreri* Bromf.). With both the parents in a lane near Hindhead, Surrey, v.-c. 17, May 27, 1933.—E. C. WALLACE. "I agree to the hybrid."—FRASER.

Potamogeton Bennettii Fryer. (*P. crispus* × *pusillus*). In the Tillingbourne at Albury, Surrey, v.-c. 17, September 2, 1933. Growing in dense masses many feet long and quite choking the streams where it is deep with a slow rate of flow. All sheets carry flowering heads. Nearby *C. crispus* occurs as a small form in a stony bed where the flow is swift and the stream shallow. See *Rep. B.E.C.*, 452 and 118, 1932.—E. C. WALLACE. "Good examples of this hybrid. The minute marginal denticulations are well seen only near the tips of the very youngest leaves."—PEARSALL.

Potamogeton acutifolius Link. Pond near R. Ouse below Barcombe Mills, E. Sussex, August 25, 1933.—W. H. PEARSALL.

Ruppia rostellata Koch. Hayling Island, S. Hants, v.-c. 11, September 16, 1933.—P. M. HALL. "Fine fruiting examples of *R. rostellata* and very acceptable."—PEARSALL.

Zannichellia palustris L., sensu stricto, a. *genuina* Asch. (Det. W. H. Pearsall.) Fishbourne Mill-pond, West Sussex, v.-c. 13, September 9, 1933.—P. M. HALL. "Well selected specimens of typical *Z. palustris* as now understood."—PEARSALL.

Zannichellia pedicellata Wahl., var. *pedunculata* (Reichb.). (Det. W. H. Pearsall.) Farlington, S. Hants, v.-c. 11, September 4, 1933.—P. M. HALL. "Excellent examples, admirably displayed."—PEARSALL.

Naias flexilis (Willd.) Rostk. & Schmidt. Esthwaite, North Lancs, v.-c. 69, August 3, 1933.—W. A. SLEDGE. "Very fine specimens of this species which is still firmly established in its only English station."—PEARSALL.

Zostera nana Roth. Mudflats, Prinstead, W. Sussex, v.-c. 13, September 30, 1933.—P. M. HALL. "I think this is correctly named for the following reasons:—The leaves are 3-nerved, none of them is over 12 in. in length or 2 mm. in width; the apex is emarginate or truncate-emarginate. There are no fruits and the floral organs are immature, but the spathe is short—not exceeding ½ in.—and the spadix few-flowered. The only rhizome I saw was slender and showed rootlets at the nodes in groups of 2-3. Similar British plants have often been referred to one or other of the varieties *angustifolia* Hornem. or *stenophylla* A. & G. of the species *Z. marina* L. I have always been diffident about the use of these names as both varieties are ill-defined and have been very variously conceived. I have a specimen in my herbarium which very closely resembles Mr Hall's plant. It is labelled *Z. marina* L., var. *stenophylla* A. & G., Montrose Basin, v.-c. 90, September 1915, R. & M. Corstorphine, and was submitted in 1920 to the late Dr J. O. Hagström who considered it to be the hybrid *Z. marina* × *nana*. His attached note is too long to quote at length but gives adequate reasons for his determination. Further investigation may establish the presence of both these species at the Sussex station and therefore the possibility of the occurrence also of the hybrid between them."—PEARSALL.

"Yes, agreeing with Cornish specimens sent to the W.B.E.C. by H. W. Pugsley."—WALLACE.

Carex inflata × *vesicaria* = *C. Pannewitziana* Fig. Intermixed with abundance of both parents. Adel Dam, near Leeds, West Yorks, v.-c. 64, June 23, 1933.—W. A. SLEDGE. "Excellent examples of this hybrid—*C. rostrata* × *versicaria* = *C. Pannewitziana* Figert in *Deutsch. Bot. Monatsschr.*, v. 97 (1887). Its chief characters are well shown by these specimens—broad leaves (5 mm.) exceeding the stem; fruits broadly ovate and very strongly inflated, with rounded bases and short or only medium necks."—PEARSALL. "Although gathered rather too young, this shows evidence of the supposed parentage and is ×*Carex Pannewitziana* Figert, forma *super-vesicaria* Kneucher in *Allg. Bot. Zeitschr.*, vii, 33 (1901)—to which form belong most, if not all, of the specimens of the hybrid collected by Marshall. The contrasting hybrid form—*super-rostrata* Kneucher—I have collected by Loch Tummel in Perthshire. The name *Pannewitziana* was first used for the British hybrid by G. C. Druce (*Rep. B.E.C.*, 479, 1909), and *C. involuta* Bab., given as the hybrid in the 11th edition of the *London Catalogue* (1925), is more probably a variety of *C. inflata*."—LOUSLEY. "Rather immature but correctly named, I think. Agrees very well with material I have examined from Loch Tummel, coll. E.S.M. Not the same as my Loch Dochart plant to which Mr Pearsall has given much attention, and which we now consider to be a form of *C. inflata* rather than a hybrid. Good and normal examples of both *C. inflata* and *C. vesicaria* grew with my plant."—WALLACE.

Carex inflata × *vesicaria*. (Ref. No. 1663). Shore of Loch Dochart, Crianlarich, Mid Perth, v.-c. 88, July 24, 1933. Here and there among the parents which, with *C. aquatilis*, form extensive beds on the southern shores of this loch.—E. C. WALLACE. "Where is the evidence for *C. vesicaria*? Certainly the fruits show the gradually tapering neck we usually associate with that species but that character alone is useless as *C. rostrata* also occasionally shows it. I consider these specimens to be *C. rostrata* for the following reasons:—(1) The spikes are much too narrow, (2) the fruits are all under 5 mm. in length, (3) the nut is that of *rostrata*, oboval, practically semicircular at the top and with the style base apparently stuck on afterwards (cf. the spike of a policeman's helmet!), (3) the glumes are sub-acute, not acuminate, (4) the leaves are too narrow, (5) the general habit of the plant bears no resemblance to that of the hybrid suggested. Fortunately, typical examples of this are included in the same distribution so the differences need not be stressed. It is to be regretted that we have no reliable figures of the fruits of *C. rostrata* readily available in our British Floras, nor has Kükenthal (*Pflanzenreich*, iv, 20). Fitch (1155) is the one most members possess but while that would be an excellent drawing of the fruits of Mr Wallace's plant it is a very poor figure of the normal fruit of this species. Coste (*Fl. Fr.*), fig. 3863, is quite good, but Lindman (*Svensk*

Fanerogamflora) fig. 109 is the best comparative representation of the spikelets and fruits of *C. rostrata* and *C. vesicaria* that I have seen in an ordinary Flora. The name *inflata* should be dropped, see *Rep. B.E.C.*, 192, 1932."—PEARSALL. "I can see no evidence of *vesicaria*—and the fruits are well formed, which is rarely, if ever, the case with the suggested hybrid. Pure *C. inflata* Hnds."—LOUSLEY.

Carex flava L. (Ref. No. 1876). Epsom Common, Surrey, v.-c. 17, June 21, 1933.—E. C. WALLACE. "Typical *C. flava*."—PEARSALL. "Yes, I would call this the type of the species."—FRASER.

Carex panicea L. Near Stanton Gate, Derbyshire, June 10, 1933.—R. BULLEY. "No leaves were on my sheet. This is a very peculiar form of the species, with spikes lax-flowered and fruits markedly obovate and twisted about in a most unusual manner. I should like to see complete plants of this."—PEARSALL. "Quite correct."—FRASER.

Carex magellanica Lam. (Ref. No. 1). Killington Common, Westmorland, v.-c. 69, June 24, 1932.—W. A. SLEDGE. "Yes, splendid examples of this rare and beautiful sedge."—PEARSALL. "Yes; it is a close ally of *C. limosa*. Two stems of mine bad female fruits on the small male spike."—FRASER. "Yes, and magnificent specimens in perfect condition."—LOUSLEY.

Carex elata All., var. *homalocarpa* (Peterm.). (Ref. No. 3). Askham Bog, West Yorks, v.-c. 64, June 7, 1933.—W. A. SLEDGE. "Good examples of this variety, the fruits of which are only faintly nerved. It is the *C. homalocarpa* Peterm. in *Flora*, xxvii, 333, 1844. Reichenbach reduced it to a variety (under *C. stricta*) in 1846. Kükenthal considers *C. elata* to be identical with *C. gracilis* Curt., and therefore uses the name *C. Hudsonii* for the species we call "*elata*." This variety becomes *C. Hudsonii* A. Benn., var. *homalocarpa* (Peterm.) Reichb.—PEARSALL. "There appears to be some confusion in the descriptions of this variety. Kükenthal, Ascherson and Graebner, and Hegi agree that it should be a more graceful plant than the type, with leaves not exceeding 2.5 mm. in breadth, the female spike more slender, and the 'nuts' plano-convex obscurely nerved. They all had in mind, apparently, a slender, graceful plant, probably not so tall as the type, from which Dr Sledge's plant differs, especially in the broad leaves, which are nearly 5 mm. in width. Rouy (*Fl. France*, xiii, 497, 1912, says, on the contrary, 'Plante robuste . . . .' and also separates out as another variety (in synonymy) *C. gracilis* Wimmer, of which his characters are rather unorthodox. I have been unable to obtain access to Peterman's original description in the short time available, but Dr Sledge's specimens do not agree with var. *homalocarpa* as described by Kükenthal or by Salmon (*Journ. Bot.*, 226, 1906), though they may well come under Rouy's strange interpretation of the variety. Pending further work I should prefer to leave them without a special name as one of the many forms of this most variable sedge, for which the adoption of the specific name *C. Hudsonii* Ar. Bennett has much to recommend it."—LOUSLEY.

Carex gracilis Curt. (Ref. No. 5). Shores of Adel Dam, near Leeds, West Yorks, v.-c. 64, June 23, 1933. A markedly slender and caespitose plant.—W. A. SLEDGE. "Yes, a slender form with small fruits—none over 2 mm. It approaches var. *strictifolia* (Opiz) Aschers."—PEARSALL. "Correct. The *Student's Flora*, ed. i, adopts *C. acuta* L. (*C. gracilis* Curtis). Coste adopts *C. acuta* L., without a synonym."—FRASER. "A form approaching var. *prolixa* Hartm."—LOUSLEY.

Carex aquatilis Wahl. (Ref. No. 1604). Shores of Loch Dochart, Crianlarich, Mid Perth, v.-c. 88, leg. R. Mackechnie and E. C. Wallace.—E. C. WALLACE. "Correct, the very characteristic spikes being well developed and typical."—PEARSALL. "Probably var. *cuspidata* (Laest.). See A. Bennett in *Trans. Bot. Soc. Edin.*, xvi, 315, 1886."—LOUSLEY.

Carex Goodenovii Gay. Bulwell Hall Park, Nottingham, August 2, 1933.—R. BULLEY. "Yes, but very immature."—PEARSALL.

Carex axillaris Good. (*C. remota* × *vulpina*). Straggling in ditch in a lane at Newdigate, Surrey, v.-c. 17, September 6, 1933.—E. C. WALLACE. "Correctly named. The fruits are abortive, about 3 mm. long, ovate, gradually tapering above to a moderate beak; sometimes they taper to each end, but in these cases one side of the base is more or less rounded. Normally the base is asymmetrically rounded (influence of *vulpina*). The fruits are strongly ribbed over the nut (as in *remota*). The glumes are mainly membranous with upper margins dentate and the midrib excurrent and very rough."—PEARSALL. "Is × *C. axillaris* Good.—one specimen very typical."—LOUSLEY.

Carex remota L. × *C. vulpina* L. (*Not* × *C. axillaris* Good.). (Ref. E.5). Roadside, near Isfield, East Sussex, June 25 and September 17, 1933, leg. J. E. Lousley and K. Pickard. This Carex was shown to me by Miss K. Pickard, who discovered it and has observed it annually ever since. It is not the recognised form of the hybrid between *Carex remota* and *vulpina* known as *C. axillaris* Good., from which it chiefly differs in the lower spikes not being digitately compound, or only very rarely so. The resulting difference in appearance is so striking that considerably difficulty has been experienced in naming it *in situ*, and the late Dr Druce proposed the name of ×*C. Boenninghauseniana* (*in litt.* to Miss Pickard, June 20, 1929), from which it differs in characters of the habit, form of the spikelets and glumes. It grows on a roadside verge in company with *C. hirta*, *C. vulpina*, and *C. remota*, and careful search has failed to reveal *C. paniculata* in the immediate vicinity. The spikelets are remote, rather larger than those of *remota*, and the glumes are rather shorter than the fruits and abruptly acuminate or mucronate. The fruits, which fail to mature, are identical with those I have examined from ×*C. axillaris* and the abortive terminal spikelets are typical of hybrids involving *remota*. The present specimens will illustrate the difficulty of applying an old specific name such as *C. axillaris* Good. to a hybrid where the original description was not drawn up to include all the forms of the hybrid occurring in nature.—J. E. LOUSLEY. Later, Mr E. Nelmes has shown me a series of this hybrid which he collected from a Gloucestershire ditch, which shows every gradation from typical ×*axillaris* to the plant now contributed.—LOUSLEY. " I have only one sheet of this but the plant justifies its label. It is not *C. axillaris* as usually understood, although that varies considerably as its descriptions show and examination confirms. All hybrid species vary between the extreme limits of their different parents, and it is therefore impossible to rigidly define them. In the case of *C. axillaris* the predominant influence of the more robust parent (*vulpina*) is so usually apparent that the name has become of general use. We do, however, very rarely come across a hybrid in which the predominant influence is that of *remota*—as in this instance. The plant is ×*C. axillaris* Good., var. *remotoformis* Rouy = *C. Kneuckeriana* Zahn in *Österr. Bot. Zeitschr.*, xl, 412 (1890). Kükenthal gives it as f. *Kneuckeriana* (Zahn) Asch. et Graebn. The line of investigation adopted was (1) obtain definite evidence that the two putative parents were growing in proximity, (2) investigate the characters which show the greatest differences. The ' fruits ' of *vulpina* are rounded at the base—often so suddenly that the actual base is truncate and feebly cordate—those of *remota* are narrowed from the middle to the base. In the hybrid before us, the fruits are abortive, M. largely predominating. The few F. fruits were, however, extremely interesting. They were of course variable, but most of them were distinctly tapering below and at the actual base often asymmetrical—one side rounded or with a sudden ' bulge,' the other appearing as if the corner had been filed off. This is indubitable evidence of the influence of *vulpina*, the fruits of which are often widest at the actual base and possess very prominent 'corners' there. In all hybrids between these two species some fruits will be found showing an abnormal bulge on one or both sides of the base. The evidence for *remota* is seen in the leaves (mostly very narrow, none over 3 mm. wide), the narrow lanceolate spikelets (only two out of eight show the slightest sign of branching) and the slender stem. A further line of investigation is afforded by the augmented effect in the hybrid of similar characters in each parent species. This is well seen in the serrulation of the beaks and necks of these hybrid fruits; it is much stronger than is usual in either of the parents."—PEARSALL.

×*Carex Boenninghauseniana* Weihe. (Ref. No. E.2). Alder swamp east of Reigate Heath, Surrey, September 14, 1933. The present locality, which cannot be far from the one known to the late C. E. Salmon, was discovered by Mr A. L. Still who kindly conducted me to the place. The hybrid sedge grows with the putative parents in an alder swamp which must be almost impassable except in exceptionally dry seasons.

Although the specimens were gathered late in the year there was no sign that fruit had ever been formed.—J. E. LOUSLEY. "I have seen only one sheet. The plant is correctly named, but much nearer to *remota* than to *paniculata*. It is the var. *per-remota* Beckmann et Figert in *Verh. Bot. Ver. Brandenburg*, xxxii, 272 (1891) (=*C. Boenninghauseniana*, var. *ambigua* Lange). On my plant there were few ♂ flowers but many abortive well-formed "fruits;" these were remarkable for their strong and abundant marginal serrulations—often extending for three quarters of the margin and occasionally right along one side from beak to base—due to the cumulative influence of both parent species."—PEARSALL. "I believe this is correct though the lower spikelets are not much branched. The upper crowded ones are more numerous than in *C. remota* which is clearly one parent."—FRASER.

Carex diandra Schrank. (Ref. No. 2). Killington Common, Westmorland, v.-c. 69, July 6, 1932.—W. A. SLEDGE. "Yes."—PEARSALL. "Yes, in nice fruit."—LOUSLEY. "I agree. It is a close ally of *C. paradoxa* with a very different utricle."—FRASER.

Setaria glauca Beauv. Cinder heaps, Newport, Isle of Wight, September 1933.—J. W. LONG. "Correct."—HOWARTH.

Spartina alterniflora Lois. Southampton Water, S. Hants, v.-c. 11, September 3, 1933.—P. M. HALL. "Correct."—HOWARTH.

Spartina stricta (Ait.) Roth. Newtown, Isle of Wight, v.-c. 10, September 5, 1933.—P. M. HALL. "Correct."—HOWARTH. "Yes; it is getting rather scarce in places."—FRASER.

Sorghum vulgaris Pers. Adventive. Waste ground, Dagenham, Essex, September 23, 1933.—R. MELVILLE. Later: This is a variety: *Sorghum cernuum* Host, as I have since determined from an examination of material at the British Museum.—R. MELVILLE.

Agrostis alba L., var. *silvatica* (Host). (Ref. No. 4096). Abinger, Surrey, July 15, 1933.—C. E. BRITTON. "Host's plant named *A. silvatica*. Ascherson and Graebner are responsible for placing it as a variety of *A. alba*. My specimen has a small lateral panicle from one of the nodes of the culm."—HOWARTH. "Yes, distinguished from var. *gigantea* Meyer (*major* Gaud.) by the muticous glumes. Rouy (*Fl. France*, xiv, p. 61, 1913) coined a new name—var. *Hostiana*—for this on the grounds that there is an earlier *Agrostis sylvatica* Pollich, which is a different plant."—LOUSLEY.

Agrostis setacea Curt. Milber, Newton Abbot, S. Devon, August 2, 1930.—R. J. BURDON. "Yes."—HOWARTH.

Agrostis setacea Curt. Chobham Ridges, Surrey, June 25, 1933.—Not a gregarious grass, but one which grows in dense tufts scattered about on moister spots of sandy soils.—J. FRASER. "Correct."—HOWARTH.

Koeleria gracilis Pers., var. *britannica* Domin, f. *glabriflora* Domin (*in litt.*). Hog's Back, Guildford, Surrey, June 19, 1932. This form differs from the variety *britannica* by having glabrous spikelets."—J. FRASER. "Correct."—HOWARTH.

Catapodium loliaceum Link [=*Poa loliacea* Huds.; *Schlerochloa loliacea* Woods; *Festuca Rottboellioides* Kunth; and *Desmazeria loliacea* (Huds.) Nyman] Grassy, shingly, shell-sandy seashore, 10 feet above sea level, The Noust, Breckness, Outertown, Stromness, Mainland, Orkney. Ref. No. 4662—plants in flower-bud, June 16, 1933; Ref. No. 4718—plants sparingly in flower, July 1, 1933; and Ref. No. 4851—plants in ripe fruit, August 24, 1933. See H. H. Johnston's "Additions to the Flora of Orkney," 16th Paper, p. 8, March 4, 1933.—H. H. JOHNSTON. "I notice that Druce in his 'List' adopts *Desmazeria loliacea*, basing his name on the genus founded by Dumortier in 1822. The date of *Catapodium* is 1827. The *London Catalogue* adopts *Festuca rottboellioides* Kunth. Dumortier's name must stand only if it is regarded that his *Desmazeria* includes this species. Perhaps it is better, with Ascherson and Graebner, to make *Catapodium* a section under *Festuca* when the name must be *Festuca rottboellioides* Kunth."—HOWARTH.

Poa nemoralis L., var. (Ref. No. 6). Ling Gill, Ribblehead, West Yorks, v.-c. 64, alt. 1000 ft., July 5, 1933. This is the *Poa Balfourii* Parn. of Lees' *Flora of West Yorks*, but I think it comes under *P. nemoralis*.—W. A. SLEDGE. "This is one of the weak forms of *Poa nemoralis* found growing at higher altitudes. Attempts have been made to delimit such forms, as e.g. *P. Parnellii* and *P. Balfourii* but all merge into *P. nemoralis* without any clear line of demarcation."—HOWARTH.

Glyceria maritima Mert. et Koch. (Ref. No. 4672). Clefts of rocky seashore, Little Pentland Skerry, Orkney, Scotland, June 21, 1933.—H. H. JOHNSTON. "The plant is undoubtedly *Glyceria distans* Wahl., var. *prostrata* Beeby, or, as Dr Druce preferred it, *Puccinellia distans* Parl., var. *prostrata* Beeby."—HOWARTH.

Festuca rubra L. Shell-sandy, rocky seashore, 10 ft. above sea-level, Kirk Geo, near Brackness House (in ruins), Outertown, Stromness, Mainland, Orkney, September 10, 1933. (Ref. No. 4878). *F. rubra* is one of the commonest grasses in Orkney and it flowers and fruits freely. Also one specimen of Ref. No. 4581 (for comparison) from short, natural, stony pasture, cropped very closely by sheep, between Westray and Papa Westray, Orkney. On August 25, 1932, I dug up a sod of grass which had been cropped short by sheep to within an inch of the ground and planted it in rich garden earth at Stromness. In 1933 the sod produced a pure dense luxuriant flowerless growth of *F. rubra* measuring from 1-2 ft. in length with blades up to 15 in. long.—H. H. JOHNSTON. "It is extremely difficult to name with any degree of certainty varieties of *F. rubra* by vegetative characters only. This specimen, Ref. No. 4581, is apparently *F. rubra*, var. *glaucescens*, owing to the sea-green colour of its leaves, but its sheaths are abnormally pubescent. Ref. No. 4878 is a similar form with glabrous sheaths and having a prostrate habit induced by the habitat, the condition being termed " pseudo-repens " because it is brought about by the great elongation of the lower internodes of a shoot, not by the production of stolons."—HOWARTH.

Festuca sylvatica Vill. (Ref. No. 7). Dent, North-West Yorks, v.-c. 65, July 6, 1933.—W. A. SLEDGE. " Yes."—HOWARTH.

Bromus erectus Huds. Moorland, Bleadon Hill, Weston-super-Mare, Somersetshire, v.-c. 6, July 1, 1933.—C. WATERFALL. "Yes."—HOWARTH.

Bromus lepidus Holmb. (*B. britannicus* I. A. Williams). Cothill, Berks, July 1933.—J. CHAPPLE. " Submitted to Mr Williams who agrees with the naming."—RILSTONE. " Correct for the older name."—FRASER.

Equisetum trachyodon Braun. Colin Glen, near Belfast, Co. Antrim, 1856, Ex. Herb. Thos. Rylands, comm. Dept. of Botany, National Museum of Wales, per H. A. HYDE. " Correctly named. It is allied to *hyemale* but differs in several characters. It has also been named *E. occidentale* Hy."—FRASER.

Equisetum sp. Canal side, Trowell, Notts, September 7, 1933.—R. BULLEY. " My sheet appears to be a simple, barren state of *E. palustre*."—HALL.

Ceterach officinarum DC. Crevices of old walls, near Weston-super-Mare, Somersetshire, June 12, 1933.—C. WATERFALL.

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THE
BOTANICAL SOCIETY & EXCHANGE CLUB OF THE BRITISH ISLES.

BALANCE-SHEET FOR 1934.

Balance from Balance-Sheet for 1933, - -	£206	2	3	Printing Reports (and carriages, &c., connected),	£204	11	11
Less Subscriptions paid in advance, - - - - -	68	4	0	Expenses of Distribution, -	2	0	3
	£137	18	3	Postages and Petty Expenditure generally (Secy. and Ass. Secy.), - -	24	6	9
Subscriptions for 1934, -	234	19	0	One Year's Allowance to Secretary, - - -	50	0	0
Subscriptions paid in advance in 1934, - - -	33	3	0	Honorarium to Ass. Secy.,	10	0	0
Sales of Reports, Reprints, and Advertisements, -	10	14	8	Insurance, - - -	0	6	0
				Balance, - - - -	125	10	0
	£416	14	11		£416	14	11

PUBLICATIONS ACCOUNT.

Balance from Balance Sheet for 1933, -	£91	17	6	Balance, - - - -	£104	9	6
Sales of Comital Flora, -	10	13	6				
Sales of Flora Northants,	0	18	6				
Sales of British Plant Lists,	1	0	0				
	£104	9	6		£104	9	6

BALANCES OF FUNDS.

Balance from General A/c.,	£125	10	0	National Savings Certificates, at cost, -	£256	16	0
Balance from Publications Account, - - -	104	9	6	National Savings Certificates, at cost, - -	143	4	0
Balance from Life Members' Fund, - -	116	8	0	Cash in hand, - - -	3	18	11
Balance from Miss Trower's Fund, - - - - -	16	7	11				
Balance from Benevolent Fund,	41	3	6				
	£403	18	11		£403	18	11

(Signed) R. C. M. Curtis, *Honorary Treasurer.*
,, John Chapple, *Assistant Secretary.*

1st February 1935.—Examined and found correct.

(Signed) F. A. Bellamy, M.A., F.R.A.S.

SECRETARY'S REPORT.

THIS Report completes vol. x, and covers what may be termed a transitional period in the Society's history. It is gratifying to note that notwithstanding the widespread cutting down of expenses which the times demand we are still in a sound financial position and our membership is well maintained. The number of new members since the issue of the last Report is 15, which exceeds the number (9) lost from various causes. Further. evidence of progress is afforded by the fact that the number of sheets sent in for the annual Distribution shows an increase on the numbers contributed during recent years.

The Society has suffered serious loss during the past year in the passing of such capable systematists as T. J. Foggitt, J. Fraser and J. E. Little. The pages of our past and present Reports afford ample evidence of the extent of our indebtedness to them, but equally valuable was their readiness at all times to render kindly service to others out of the fulness of their special knowledge. Among foreign botanists who have served the Society may be mentioned Prof. Dahlstedt—the eminent authority on *Hieracium* and *Taraxacum*—who died on October 2nd, 1934. We also greatly regret the decease of Earl Buxton, who presided at our Conversazione in 1932 and has given much support to our members in many other directions.

We are pleased to report that the series of botanical excursions arranged for members during 1934 was an unqualified success and afforded very great interest and enjoyment to those who were able to attend. In response to many requests for their continuance, we are pleased to say that Mrs Gertrude Foggitt has again kindly undertaken the arrangement of a further series for 1935. Dates and particulars of these may be obtained upon application to the Secretary.

The General Committee met four times during the year and the Publications' Sub-Committee twice. The results of the deliberations of the latter were embodied in a draft set of Rules submitted to the Annual General Meeting on 27th March 1935. These were separately and collectively considered, in some cases slightly amended, and finally unanimously adopted as herein set forth.

The Annual General Meeting was held in the rooms of the Linnean Society and was very well attended. The Rt. Hon. Harold T. Baker, P.C., was again re-elected Chairman; Sir Roger Curtis, Bart., as Treasurer, and Mr W. H. Pearsall as Secretary. All the members of the General Committee were re-elected but in future they will retire by rotation in accordance with Rule 3 (d). The meeting concluded with an expression of our indebtedness to the Linnean Society for the use of the room.

In order to facilitate an earlier publication of our Reports, we should be glad to receive all plant Records by December 31st. As each record has to be card-indexed, it would save much time and labour if members would use the ruled cards (12.5 × 7.5 cm.) sold by stationers for this purpose, and on each write (1) the Oxford List number, (2) the name of the plant, (3) the locality, giving the vice-county, (4) any additional note of Scientific interest, (5) the collector's name. (Rule *two* lines under the name of the plant and also under that of the collector.) As regards MS., the latest date upon which any can be received is March 31st in each year. Members are invited to submit original papers or articles upon subjects of botanical interest. Altogether apart from the value of the Society's publications is that of its correspondence. Members are invited to submit any of their botanical difficulties to the Secretary, who assures them that he is always delighted to render any assistance in his power.

As in previous years, we are deeply grateful for the very willing and invaluable co-operation of all those who have rendered assistance in the critical examination of British plants or who have given ready and kindly help in other directions. We tender our sincerest thanks to the authorities of the Royal Botanic Gardens at Kew and to those of the British Museum at Cromwell Road. Among foreign botanists we are indebted to Prof. O. E. Schulz, Dr Gunnar Samuelsson, Dr B. Lindquist, Dr G. E. Du Rietz, Dr K. H. Osvald, Dr Johannes Lid and Prof. M. L. Fernald. We are deeply appreciative of the kindly offices of the following British botanists:— Mr J. Ramsbottom, Mr A. J. Wilmott, Mr Geo. Taylor, Mr A. B. Jackson, Mr J. S. L. Gilmour, Dr W. B. Turrill, Dr T. A. Sprague, Mr A. D. Cotton, Mr N. Y. Sandwith, Lt.-Col. A. H. Wolley-Dod, Mr E. B. Bishop, Rev. H. J. Riddelsdell, Mr W. C. Barton, Mr H. W. Pugsley, Mr W. O. Howarth, Mr P. M. Hall, Dr W. A. Sledge, the late Mr J. Fraser, Mr A. E. Wade, Mr C. E. Britton, Dr R. W. Butcher, Dr F. W. Stansfield, Mrs H. Drabble, Mrs Gertrude Foggitt, Lady Davy, Miss E. Vachell, Miss M. S. Campbell, and Miss G. Wigglesworth.

NEW MEMBERS.

Mr A. H. G. Alston, M.A., F.L.S., Dept. of Botany, Brit. Mus. (Nat. Hist.), Cromwell Road, London, S.W.7.
Mr F. A. Brokenshire, 2 Rock Avenue, Barnstaple, N. Devon.
Major J. W. Cardew, 38 Earlsfield Road, Hythe, Kent.
Dr H. L. Gauntlett, F.R.E.S., F.L.S., F.R.H.S., 37 Howard Lane, Putney, London, S.W.15.
Dr B. Millard Griffiths, F.L.S., University Science Laboratories, South Road, Durham.
Mrs B. Hassall, Hithercroft, Goodworth Clatford, Andover, Hants.
Mrs C. Moore Kennedy, c/o Westminster Bank, Bromley, Kent.
Dr J. Axel Nannfeldt, Botaniska Institutionem, Uppsala, Sweden.
Miss Alice Perrins, 33 Inverness Terrace, Bayswater, London, W.2.

Mr N. Y. Sandwith, M.A., The Herbarium, Royal Botanic Gardens, Kew, Surrey.
Mr F. Smalley, 5 Almond Grove, New Earswick, York.
Mr J. J. Stuart Edwards, Imperial Hotel, Exmouth, Devon.
Mr W. P. Winter, B.Sc., F.G.S., 6 Grange Avenue, Saltaire, Yorks.

LOCAL SECRETARIES.

Those given in 1933 *Report*, p. 467, and the following additions:—

Monmouthshire. A. E. Wade, F.L.S., Dept. of Botany, National Museum of Wales, Cardiff.
Northumberland and Durham. Geo. W. Temperley, 4 Selborne Avenue, Low Fell, Gateshead.
Moray and Banff. Rev. Geo. Birnie, The Manse, Speymouth, Fochabers, Morayshire.

CHANGE OF ADDRESS OR TITLE.

*The Manchester Museum, the University of Manchester.
Rev. W. Keble Martin, M.A., F.L.S., The Vicarage, Torrington, N. Devon.
Francis Druce, M.A., F.L.S., 60 Burton Court, London, S.W.3.

RULES OF THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

Draft submitted by Publications' Sub-Committee—as Amended and Approved by the Annual General Meeting of 27th March 1935.

1. NAME.

The name of the Society shall be The Botanical Society and Exchange Club of the British Isles.

2. OBJECTS.

The objects of the Society are:—

i. To stimulate the study of the Flowering Plants and Vascular Cryptogams of the British Isles.
ii. To facilitate intercourse between British Botanists for the exchange both of ideas and of dried material of critical species.
iii. To aid in the maintenance of adequate representative collections of British Plants in the National Herbaria.
iv. To support the aims of the Wild Plant Conservation Board for the protection of the British Flora.
v. To organise botanical excursions.

3. OFFICERS OF THE SOCIETY.

(a) The management of the affairs of the Society shall be in the hands of a Committee.

(b) *The Committee* shall consist of the Chairman, Vice-Chairman, Honorary Secretary, Honorary Treasurer, and sixteen elected members.

(c) *The Chairman and Vice-Chairman* shall be elected annually at the Annual General Meeting, and shall be eligible for re-election.

(d) *The elected members of the Committee* shall be elected at the Annual General Meeting; four of the elected members shall retire every year by rotation, and shall not be eligible for re-election until the expiration of a year.

(e) The *Honorary Secretary* and *Honorary Treasurer* shall be elected annually at the Annual General Meeting, but shall be eligible for re-election.

4. MEMBERSHIP.

(a) Membership of the Society is open to all botanists upon payment of ten shillings, which shall entitle them to the privileges of membership until the succeeding 31st day of December.

(b) Candidates for membership shall obtain from the Honorary Secretary a copy of the Rules of the Society and sign a Form of Declaration of their willingness to support the objects of the Society and to accept the responsibilities and privileges of membership.

5. HONORARY AND CORRESPONDING MEMBERS.

Distinguished Foreign Botanists, who are not members of the Society, may be elected Honorary Members of the Society on the recommendation of the Committee at the Annual General Meeting. Distinguished British Botanists may, in the same way, be elected Corresponding Members. Such Honorary and Corresponding Members shall enjoy all the privileges of membership.

6. ANNUAL SUBSCRIPTIONS.

(a) Annual subscriptions shall be Ten Shillings per annum for ordinary members and £1 per annum for exchange members.
(b) Annual subscriptions shall become payable upon the first day of January in every year.
(c) Notice shall be given to every member of his subscription being due.
(d) Any member whose subscription shall be in arrear for two years on the first day of January in any year shall cease to be a member.

7. LIFE MEMBERSHIP.

Life membership may be compounded in one payment of £7 in the case of ordinary members and £12 in the case of exchange members.

8. PRIVILEGES OF MEMBERSHIP.

Each member of the Society shall enjoy the following privileges:—
(a) To receive one copy of the Honorary Secretary's Report and one copy of the Distributor's Report every year.
(b) To submit Plants for naming to the Honorary Secretary (return postages on parcels being prepaid by the sender).
(c) To consult the Officers and Official Referees of the Society upon any question affecting British Botany.
(d) To submit papers and notes for inclusion in the Annual Report.
(e) To attend, and vote at, all meetings of the Society.

9. PRIVILEGES OF EXCHANGE MEMBERS.

In addition to all the privileges of ordinary members, exchange members shall also have the following privileges:—
(a) To receive two additional (*i.e.*, 3 in all) copies of the Distributor's Report every year.
(b) To contribute parcels of dried plants and participate in the annual Exchange Distribution, which will be conducted in accordance with such regulations as the Committee may from time to time direct.
(c) Copies of the Regulations of the Exchange Distribution may be obtained free of charge from the Honorary Secretary.

10. RESIGNATION.

Any member wishing to resign from his membership shall give written notice to the Honorary Secretary before the first day of December in any year of his intention to resign, failing which he shall be liable for the payment of his subscription for the ensuing year.

11. EXPULSION FROM MEMBERSHIP.

If it be proved at any time to the satisfaction of the Committee that any member has acted in any way contrary to the objects or derogatory to the interests of the Society, the Committee shall make a report on the matter to the next Annual or Special General Meeting; on a vote of not less than two-thirds of the members present at such meeting in favour of expulsion, the member concerned shall cease to be a member of the Society and shall forfeit all claim upon the Society and its funds; he may, however, be subsequently reinstated, but only by ballot of the members present at an Annual General Meeting.

12. HONORARY SECRETARY.

(a) The Honorary Secretary, in addition to his ordinary secretarial duties, shall act as the Editor of the Annual Report of the Society, under the supervision of an Editorial (Publications) Sub-Committee appointed by the Committee.

(b) The Honorary Secretary shall be entitled to such honorarium for his services as may upon the recommendation of the Committee be voted at the Annual General Meeting.

13. FINANCES OF THE SOCIETY.

(a) The funds of the Society shall be nominally vested in the Chairman and Honorary Treasurer for the time being.

(b) The Committee shall have power to adopt such financial measures as may seem to them to be expedient in the interests of the Society.

(c) A member of the Society shall act as Honorary Auditor, and the annual accounts, having been audited by him, shall be approved by the Committee before presentation to the Annual General Meeting.

14. CHAIRMANSHIP.

At all Committee and General Meetings the Chair shall be taken by the Chairman, or in his absence by the Vice-Chairman. In the absence of both, the Chair shall be taken by a member of Committee elected by the meeting.

15. MEETINGS OF THE COMMITTEE.

(a) The Honorary Secretary shall be authorised to call a meeting of the Committee upon the written request of the Chairman or of not fewer than three members of the Committee.

(b) A quorum at a meeting of the Committee shall consist of five members.

(c) The Committee shall have power to add to their numbers not more than four co-opted members, who shall be members of the Society. Such members shall serve until the following Annual General Meeting, but shall then be eligible for election to the Committee.

16. ANNUAL GENERAL MEETING.
    (a) The Annual General Meeting of the Society shall be held in March in each year at such time and place as the Committee shall direct.
    (b) A quorum shall consist of seven members.
    (c) Voting shall be conducted by show of hands, but on the ruling of the Chairman, or on the demand of not fewer than five members present, voting shall be by ballot.

17. SPECIAL GENERAL MEETINGS.
    (a) The Honorary Secretary shall, by direction of the Committee, or at the written request of not fewer than seven members, call a Special General Meeting of the Society for the consideration of any business of interest to the Society.
    (b) A quorum shall consist of seven members.
    (c) Voting shall be conducted by show of hands, but on the ruling of the Chairman, or on the demand of five members present, voting shall be by ballot.

18. NOTICES OF MEETINGS AND EXCURSIONS.
    Notice of the Annual and Special General Meetings, and the agenda of such meetings, shall be sent to every member by post at least 14 days before the date of the meeting. The programme of excursions shall be sent to all members at the beginning of each season. Notices to members shall be sent by post to their last known address.

19. CASTING VOTE OF CHAIRMAN.
    When there is equality of votes at any Committee, Annual, or Special General Meeting, the Chairman shall have a second or casting vote.

20. ALTERATION OF RULES.
    No rule shall be made or altered except at the Annual General Meeting, and then only after 28 days' notice has previously been given in writing to the Honorary Secretary, in order that he may give 14 days' notice to all members of the Society of the proposed addition or alteration to the Rules.

21. PROCEEDINGS OF MEETINGS.
    The proceedings of all General Meetings shall be recorded in the Secretary's Annual Report.

22. CITATION OF ANNUAL REPORT.
    The title of the Society's Annual Report shall be abbreviated for citation as follows:—B.E.C. 1932 Rep. 123 (1933), referring to p. 123 of the Report for 1932 published in 1933.

23. REFEREES.
    The Committee shall prepare from time to time a list of Referees to whom it is recommended that critical groups of plants or special plants should be submitted for naming.

PLANT NOTES FOR 1934.

54/22. **Brassica adpressa** Boiss. The abundance of this species in and around the village of Glynde, Sussex, has long been a puzzle to botanists, but casual conversation with an old inhabitant recently revealed the following facts. There is a large chalk pit near the station which seems to be the spot whence the plant has spread. In addition to burning and sending out lime as manure, the owners at one time imported from Russia and Germany blocks of lightly pressed Rape Cake which were ground and also sent out as manure. It was after a consignment had been dealt with about fifty years ago that the plant was first noticed, and it seems that the workmen afterwards knew it as "German Cress." On enquiry, the owner of the works vouches for these facts and adds that the late Mr J. H. A. Jenner—a well-known Sussex botanist—thought that they almost undoubtedly explained the original appearance of the plant.—K. Pickard.

153/2. **Medicago varia** Martyn in East Norfolk (v.-c. 27). This note supplements J. S. L. Gilmour's paper on *Medicago sativa* × *falcata* hybrids in *B.E.C.*, x, Pt. 1, 393-395. *M. falcata* has existed on the denes at Great Yarmouth for more than a century. In 1929 several hundred plants were examined on the north denes, all typical *falcata*; no trace of hybridism was found. In 1933 the colony, which had become reduced to about sixty plants through the encroachment of town building, produced one specimen of *M. varia*. In July 1934 several clumps of *falcata* and variously coloured forms intermediate between it and *sativa* were noticed on the south denes. At Eaton and Keswick, near Norwich, three patches of *M. varia* were thriving in 1932, the flowers being clear yellow, yellow fading green, purple or purple fading green; no typical *falcata* could be discovered in the neighbourhood. These flowers were immersed in weak acid and alkaline solutions in order to obtain some indication of anthocyanin or other pigment reaction, with the following result. Light purple flowers became red when placed in acid, but changed through blue and green to yellow in the alkali. Clear yellow flowers, on the other hand, showed no change when tested either way; but wherever there was a slight tinge of green or purple, response was forthcoming. Normally purple *sativa* was found to turn yellow with alkaline treatment, but *falcata's* yellow remained unaltered. Therefore two types of colour factor must be present in the group, one an anthocyanin. *M. falcata* at Yarmouth was a much deeper yellow than any yellow forms of *varia*.—E. A. Ellis.

185/40(3). ✠**Rubus glanduliger** spec. nov. *Turio* arcuatus sulcatus glaucescens subglaber, glandulis rarissimis obsitus; aculei inaequales mediocres e basi compressa recti vel declinati, secundum angulos plerique omnes dispositi. *Folia* quinata digitata; petiolus petiolulique canaliculati purpurei, aculeis parvis aduncis armati; stipulae latiusculae rubrae glandulosae. *Foliola* omnia convexa longe acuminata saepe deorsum angustata haud contigua, supra glabrescentia subtus primo appresse pilosa dein glabra; *terminale* ovale saepe in basin truncatam contractum, inaequaliter vix duplicato-dentatum; petioluli infimi 2-4 mm. longi. *Ramus* flexuosus angulatus laxe pilosus aculeis parvis deflexis armatus. *Panicula* brevis sat ampla, inferne interrupta superne efoliosa omni parte glandulis inconspicuis aspersa; ramuli superiores cymosi vel interdum hemicymosi, pedicelli longi divaricati. *Petala* alba obovata in flore expanso remota. *Sepala* canescenti-virentia laxe pilosa, appendiculata post anthesin patula vel parum erecta. *Stamina* stylos superantia demum conniventia. *Fructus* oblongi e drupeolis numerosis compositi. *Carpophorum* laxe pilosum.

Type specimen in Hb. Watson, West Lavington, W. Sussex, collected in August 1932.

Frequent on the commons and in the hedges and woods at and around Midhurst, Petworth and Bognor, W. Sussex.—Wm. Watson.

185/98(2). ✠**R. tardus** spec. nov. *Turio* arcuato-procumbens vel scandens obtusangulus striatus glabrescens inaequaliter glandulosus glanduloso-setosusque, aculeis interdum glanduliferis e basi tumida declinatis falcatisve confluentibus praeterea aculeolis tuberculatis armatus. *Folia* quinata, petioli longi villosi, stipulae lineari-lanceolatae; foliola parvula plicata margine undulata subduplicato-dentata, subtus cano-vel albo-tomentosa velutina ad nervos pilosa; *terminale* obovato-cuneatum basi integrum; infima 3-5 mm. petiolulata. *Ramus* angulatus inferne pilosus superne pubescenti-tomentosus. *Inflorescentia* subpyramidalis inferne interrupta superne angustata flore subsessili terminata, aculeis mediocribus rectis glandulisque inaequalibus in setis glanduliferis transeuntibus instructa. *Sepala* extus cano-virentia rubro-aculeata glandulosa vix appendiculata post anthesin patula. *Petala* roseola elliptica vel obovata, magna. *Stamina* alba, longa. *Styli* jam ante florem expansum rubentes. *Fructus* tarde et sero maturantur.

Type specimen in Hb. Watson, ex Hayes Common, W. Kent.

Synonym: *R. Griffithianus*, subsp. *tardus* Wm. Watson, in *London Naturalist*, 1932, p. 62, excluding the Mortimer Common specimens, which are *R. Lejeunei* Weihe type.

Distribution: Bostal Heath, Hayes Common, Farnborough Common, W. Kent; Putney Heath, Mitcham Common, Surrey.—Wm. Watson.

266/1. **Aethusa Cynapium** L. An interesting abnormal form of this species was gathered near Cheadle Hulme, Cheshire, by Mr J. W.

Hartley. Some of its umbellules had the normal 2-3 long linear undivided reflexed bracteoles at their bases but those on the shorter central rays of the umbel possessed large ternate foliaceous bracteoles 2.5-3.0 cm. in length and having pinnate lobed segments. Otherwise the flowers, fruits and foliage were quite of the usual type.

539/1b. ✠LIMOSELLA SUBULATA Ives. Dr Glück considers the plant known in England as *Limosella aquatica*, var. *tenuifolia*, to be a distinct species *L. subulata* Ives. It differs from *L. aquatica* in having all its leaves subulate or cylindrical and its style 1½-2 times *longer* than the ovary. In *L. aquatica* the leaves are normally longly petiolate with a lamina distinct. They are only subulate in very young or submersed plants. The style is *shorter* than the ovary—⅔ to ¼ its length.

558/3b. MENTHA NEMOROSA Willd. and sub-species. (Abstract from *Bot. Közlemeneyek*, xxx, 1933, 1, R. Trautmann.) The author considers *M. nemorosa* Willd. to be a good species, ranking with *M. rotundifolia*, *M. longifolia*, and *M. spicata*. He bases his opinion on the collective importance of several characters:—

(i) The obovate shape, sharp serratures, and long acuminate points of the uppermost pair of stem-leaves.
(ii) The thin texture of the leaves, especially in dried specimens.
(iii) The simple venation and absence of felting on the underside.
(iv) The absolute fertility and readiness to hybridise with Mints from other groups.
(v) The facts of distribution, *M. nemorosa* belonging mainly to Central and Northern Europe, while *M. rotundifolia* extends rather in a S. and W. direction and towards the coast. *M. nemorosa* may perhaps be regarded as replacing *M. rotundifolia* in the Northern regions.

The author attaches great importance to the shape of the uppermost pair of stem leaves. These are widest in the distal half, and are more deeply and sharply serrate than the lower leaves, with a long entire acuminate point. He agrees with Sagorski and Osswald (Mittl. des Thuring. Bot. Verein., 1910) in rejecting the idea that *M. nemorosa* Willd. is a hybrid of *M. rotundifolia* with *M. longifolia* or *M. spicata*, on the ground that none of these Mints shows the constant characteristic shape of the leaves above referred to; and also on consideration of texture and venation.

Author's Description.

Plant 30-100 cm. high, more or less branched, middle stem leaves medium to large, rounded or oblong, often slightly obovate, acute to acuminate, narrowed to the base, rounded and cordate, sessile or shortly petiolate; bright or dull green above, sparsely and shortly hairy; glaucous or silvery-green below and more or less tomentose, veins not sunken nor reticulate, margins sharply and coarsely serrate. Upper stem-leaves definitely obovate, with long acute point, similar to the lower leaves in hairiness or serration. All leaves with conspicuous and abundant glands on the lower surface. Spikes dense, of moderate length. Leaves almost papery when dry.

In addition to the type, with sessile leaves, two varieties are given, with petioles up to 4 mm.

(a) *M. nemorosa* Willd., ssp. *Moesziana* Trtm. Plant bright green, glands on lower surface not coloured.

Forma (α) *septentrionalis* Trtm. Leaves rounded, not twice as long as broad.

Forma (β) *Helenae* Trtm. Leaves twice as long as broad or even more.

(b) *M. nemorosa* Willd., ssp. *atriglandulosa* Trtm. Plant dusky green, glands on lower surface black or brown.

Hybrids with *M. longifolia* (*M. Wagneriana*, *M. Gáyeri*, and *M. Lykana* Trtm.) and with *M. aquatica* (*M. Kummerléi*) are mentioned, but full descriptions not given.

A. L. S.

Note.—In the light of the above paper, it might be well to examine the specimens of British plants under the label of *M. nemorosa* Willd., whether classed as vars. of *M. longifolia* Huds. or *M. niliaca* Jacq. Some of these will certainly not fit Trautmann's description, but he states that he has compared his plants from various sources with Willdenow's specimens at Berlin and that they agree in the characteristic leaf-shape. His paper contains a photograph of Willdenow's specimen.

558/9p. ×M. VERTICILLATA L., var. TRICHODES Briq. About forty years ago the late Dr Druce collected a Mint at Hereford which was sent with others to Geneva for determination by M. J. Briquet. After about 30 years the parcel was recovered and the Hereford plant had been named var. *trichodes* Briq. Mr J. Fraser wrote a paper entitled " Menthae Briquetianae " in the *Rep. B.E.C.* for 1924, giving descriptions of the Mints in this parcel. Up to the present the sheet in the Druce Hbm. at Oxford has been the only authenticated example of var. *trichodes* in this country. Of this Mr Fraser writes " it was the worst in the whole bundle named by Briquet. I hesitated before describing it at all, and resolved to do so only because Briquet determined it." Nevertheless Mr Fraser's description is an excellent one. While collecting Mints in Gower last August I came across one at Park Mill which I was unable to place but which I thought might be var. *trichodes*. Since this discovery the plant has been sent to me from another locality about two miles distant, among a gathering of *M. gentilis* which it closely resembles when growing, especially late in the season. Mr Fraser was not inclined at first to agree, but I have since compared the Park Mill plant with the sheet at Oxford and have no doubt that the two are identical. The following description is based on Mr Fraser's, but somewhat amplified by the better material now available: " Stem ± branched, hairy, 1 ft. high (or more), internodes

2-4 cm. long. Leaves of medium size, oblong, acute or cuspidate, ± hairy on both faces; superficies 2.0-3.5 cm. × 1.3-1.5 cm.; serratures somewhat irregular and triangular. Bracts passing gradually from a lanceolate shape with similar serratures, through a very acute or acuminate stage with few pairs of acute or acuminate serratures, to an ovate acute form with one pair of serratures only. Whorls numerous, up to 16 or more on strong shoots; flowers bright purple. Often no whorls in terminal pairs of bracts. Whorls rather crowded towards the terminal part of the shoot, but not sub-spicate. Pedicels and calyces hairy, but the hairs on pedicels sparse and short for this hybrid. Under favourable conditions of rainfall most of the foliage on side-shoots of cut-back plants may consist of large (2.5 cm.) ovate acute leaves with or without verticils of flowers having the characteristic acuminate serratures, 3 to 6 pairs." The "subulate" serratures mentioned in Mr Fraser's description do not actually exist. They sometimes appear to have this form in dried specimens because the edges curl back where the pressure has not been sufficient to prevent this.

This plant should be looked for round Hereford, and I should be glad to see specimens from that district. In the stations mentioned above it is a roadside or turf plant, not a waterside form.—A. L. STILL.

737/2d. **POTAMOGETON.** The various species of this genus are extremely polymorphic and none more so than *P. polygonifolius* Pourret. In *Pots. Brit. Isles*, 19, 1915, Fryer observes that "*P. polygonifolius* is so variable according to the depth of water in which it grows, and is so susceptible to the local conditions of every kind, that each district, almost, seems to produce a peculiar form." Long experience among the English Lakes has convinced me that the deep water forms of this species are imperfectly understood and have been very greatly confused. Particularly is this the case with forms having very long and very narrowly lanceolate leaves—usually 5-6 mm. wide or less—with or without subcoriaceous floating leaves having cancellate venation, and normally not producing fruit. These have been referred by different authors at various times to *P. polygonifolius*, var. *linearis* or var. *pseudofluitans* Syme; *P. Kirkii* Syme; *P. sparganifolius* Laest.; *P. crassifolius*, f. *verruta* Fryer, and *P. oblongus*, f. *angustifolius* Fries. The Killarney specimens upon which Syme founded his var. *linearis* are abnormal forms of *P. natans* induced by running water. *P. Kirkii* Syme and *P. sparganifolius* Laest. are forms of the hybrid *P. gramineus* × *natans*, and *P. crassifolius* Fryer is most probably *P. lucens* × *natans*. The particular forms referred to at the outset cannot be included under any of these four plants, one of which is a form and the other three hybrids of *P. natans*, as they show not the least trace of the influence of that species but are quite definitely *P. polygonifolius*. There remain, therefore, only the forms or varieties of this species to consider. I agree with Dr Hagström (*Crit. Res.*, 177-8, 1916) that "the f. *angustifolius* Fries cannot be distinguished from the f. (or var.) *lancifolius* Ch. & Schl. Both occur in rivulets. The same is the case with var. *pseudo-fluitans* Syme." The original descriptions of these three forms are: *P. oblongus*, f. *angustifolius* Fries, Novit. Fl. Suec., ed. ii, 30 (1828), "*foliis natantibus lanceolatis, nervis subtus immersis, quae fluviatilis.*" Fryer expresses a very general opinion when he says (*Pots. Brit. Isles*, 20) that he does not understand this description. It is so brief and vague as to be of little use in the determination of forms and is now commonly discarded. *P. oblongus*, f. *lancifolius* Chamisso & Schlechtendal, *Linnaea* ii, 215 (1827), "*Major, caulis bipedalis, folia coriacea, 4 poll. longa, 9 lin. lata, fluitantia immersa membranacea 4 poll. sunt longa, 6 lin. lata.—Minor, abbreviatus, folia sesquipollicaria, 5-8 lin. lata. In fossis aqua haud profunda. In aqua profundiore reperiuntur specimina circiter pedalia, petiolis inferioribus longissimis ad 9 poll. usque longis. Majora fluitantia specimina utriusque formae non vidimus fructifera, inde nonnihil dubia.*" A very free translation shows that the authors included two forms under their f. *lancifolius*—a larger, with a stem 2 ft. long, floating leaves coriaceous, 4 in. × ¾ in. (10 × 2 cm.) and submersed leaves of the same length but only ½ in. (12 mm.) wide; and a smaller, with fl. ls. half as long again, 6 in. (15 cm.) and from 10-16 mm. wide. Both are found in water by no means deep. In deeper water are found specimens about a foot long, having very long lower petioles up to 9 in. (22.8 cm.) in length. Fruiting examples had not been seen.

It may be observed that the original authors described this plant as a "form." It cannot, therefore, be cited as var. *lancifolius* Cham. & Schlecht. (cf. *L.C.*, 1945b, and my paper, *Rep. B.E.C.*, 1930, 386). Ascherson and Graebner were the first authors to raise it to varietal rank (*Synops. Mitteleurop. Fl.*, i (1897), 306). It should therefore be amended to read var. *lancifolius* (Ch. & Schl.) Asch. & Gr.

The British forms now under discussion rarely possess floating leaves and these are not the normal coriaceous leaves of this species but of thin texture, only subcoriaceous, and having a cancellate venation suggesting that of *P. coloratus*. Moreover, their submersed leaves are normally only half the width (5-6 mm.) of the narrowest similar leaves of f. *lancifolius* here described. *P. polygonifolius*, var. *pseudo-fluitans* Syme, *Eng. Bot.*, ed. iii, 1869, vol. ix, 28, is thus described, "Lower leaves membranous, elliptical strap-shaped, attenuated at each end; floating leaves subcoriaceous, gradually attenuated into the petiole." This is a broad-leaved form of the var. *lancifolius* and was included under that in my former paper. It is therefore obvious that none of the existing descriptions of the varieties of *P. polygonifolius* is entirely applicable to the British forms now under notice. I propose, therefore, to describe them as a new form under the var. *lancifolius* (Ch. & Schl.) Asch. & Gr.

F. nov. *attenuatus* Pears. *Folia omnia lanceolata; natantia pauca subcoriacea cancellata, submersa numerosa tenuissima angustissime lanceolata, ca. 5-6 mm. lata, basi apiceque longe attenuata. Fructus non visus. In aqua stagnante. Typus in Herb. Mus. Brit.*

So far I have only seen examples of this form from some of the deeper English Lakes—e.g., Wastwater and Ullswater—and from Lundy Island collected by Dr F. R. Elliston Wright, 1934. Vouching specimens of the latter are distributed this year.

753/33. CAREX DIVERSICOLOR Crantz. Salmon, *Fl. Surrey*, p. 631, line 5, quotes a note by J. E. Smith giving for this species a record by Mr Abbot, 1799, for " Clapham between woods " as a Surrey station. Abbot, rector of Oakley Raynes, lived quite near Clapham between Woods—or Twin Woods, as they are now marked on the map of Bedfordshire. In *Fl. Bedfordshire*, 1798, p. 303, No. 1033, is given Wood Agaric, *Agaricus xylophilus*, " Clapham between Woods," and on p. 312, No. 1065, Azure Boletus, *B. cyanescens*, " Clapham between Woods "—both by C. Abbot. I think this " between Woods " (*Fl. Surrey*) was the Beds locality and not a Surrey station.—J. E. LITTLE.

754/. BEGINNING THE STUDY OF GRASSES. The answers to the following queries sent in by members may possibly be of more general interest.

I. " *Glumes*, in Babington. Does *lower* and *upper* correspond with *inner* and *outer* of other authors? If so, which is which? " It often requires some care to decide which glume is the lower—in position—but having once settled the question, the other glume becomes the upper. *The lower is the outer; the upper is the inner.* As a general rule the upper (or inner) is the larger, but in *Agrostis* the smaller. Often there is very little difference between them in size. In some species, however, as *Avena flavescens* L., the upper glume is often nearly twice as long and 3-4 times as broad as the lower.

II. " What are the *awns* referred to in your paper? " The awns are bristles or hairs attached to the pales or glumes of grasses. Often the boat-shaped outer pale tapers to a fine point terminating in a bristle or awn—short or long, straight or bent. These *terminal* awns are conspicuous and easily seen even without dissecting the spikelet, but sometimes the bristle or hair is attached to the bottom or middle of the back of the pale—a *basal* or *dorsal* awn, respectively. These are very often entirely overlooked or thought to be terminal and short when they are really basal and long, and a wrong determination results. This is due to the fact that they are hidden behind the glumes and their true character cannot be seen without first removing the glumes. It is well to remember that awns are as a general rule attached to the pales, and very rarely to the glumes.

III. " Apparently the spikelets of the enclosed grass possess no awns, or am I in error? " The enclosed grass is *Agrostis alba* L. Looking at a spikelet with the naked eye all you see *are* the 2 glumes! The " snag " here is that in this species—and also in *A. vulgaris*—the glumes are larger than the enclosed pales and therefore hide the latter from view. If you dissect a spikelet you will see this. The pales inside are smaller and much more delicate than the glumes enclosing them. When you have separated them by cutting across their hinged base you will see this difference. With a lens you will notice that the *lower glume has its keel minutely toothed for the greater part of its length.* The outer pale is white, membranous and delicate, slightly notched at the apex but with no minute teeth on its back. The inner pale is very tiny. See also my reference to *Aira flexuosa.*—W.H.P.

824/14. THE POA ANNUA GROUP IN GREAT BRITAIN, by J. A. Nannfeldt (Uppsala Botanical Institute). Recently I made the interesting discovery that *Poa supina* Schrad., which is a very distinct species though closely allied to *P. annua* L., has a rather large distribution in Sweden, as I was able to detect specimens in our public Herbaria from over two dozen localities, from Skåne in the south to Jämtland in the north. It proved also that the said species had a much wider area of distribution than hitherto supposed, for I found specimens of it from Latvia and Sibiria. Numerous Swedish specimens were labelled *P. annua*, var. (or f.) *supina*, but these belonged only exceptionally to the true *P. supina.* They were mostly only modifications of the common *P. annua* with their spikelets slightly darker than usual.

P. supina seems to be a truly native species of Sweden, growing preferably in moist meadows, along streams, in bogs, on moist forest-paths and roads, etc. It forms not rarely a totally sterile hybrid with *P. annua*, which up to date I have been able to identify from five Swedish localities.

I was then interested to see whether *P. supina* could also be found in other north-european countries. It could be strongly surmised to grow in Great Britain, and in the last (=2nd) edition of Druce's *British Plant List* (p. 131) *P. annua* is listed with six varieties, viz., *varia* Gaud. (*supina* Schrad. = ? *picta* Beck.); *aquatica* A. & G.; *reptans* Hausskn.; *villosa* Leight.; *perennis* Dr.; and *remotiflora* (Murb.). This last name would indicate a third distinct species of the *annua*-group (=sect. Annuae Fr. = Vagantes Nym. = Ochlopoa A. & Gr. = Pilosae v. Oett.), viz., *P. exilis* (Tomm.) Murb. = *P. remotiflora* (Hack.) Murb., which is a Mediterranean species and—as far as I am aware—not known with certainty outside that region.

Through the kindness of Mr John Chapple I was allowed to study the material of *P. annua* (incl. varieties) in the Druce herbarium, in all 45 sheets and many of them containing two or more gatherings. The examination gave a negative result—in other words, all gatherings (two totally misnamed excepted) belonged to *P. annua* s. str. It is of course too early to state definitely that *P. supina* and *P. exilis* do not occur in Britain, but they may be regarded as very doubtful members of the British flora. However, British botanists should keep their eyes on *P. annua*, and thus it may not be out of the way to call attention to some of the differences between the three species.

P. exilis: Strictly annual. Panicle oblong, rather narrow, 1 1/2-3 times as long as broad. Spikelets with no reddish tinge; flowers widely separated, the (female) top-flower slightly longer than its pedicel. Anthers very small, only 0.22-0.33 mm. long.

P. annua: Annual or sometimes perennial. Panicle oblong-triangular, broader, 1.2-1.6 times as long as broad. Spikelets often tinged with red or violet; flowers closer together, the (female) top-flower at least twice as long as its pedicel. Anthers medium sized, 0.6-0.8 (-1.0) mm. long.

P. supina: Strictly perennial. Panicle broadly triangular, mostly about as long as broad. Spikelets mostly dark purple (only in deep shade green), shorter and broader than in *P. annua*; flowers still closer together; flowering glumes broader and obtuser than in *P. annua*, their intermediate nerves always glabrous (the hairiness of the glumes very variable in *P. annua*, but usually all nerves hairy, at least slightly). Anthers very large, 1.6-2 (-2.5) mm. long.

As seen from the above, *P. annua* takes an intermediate position in all particulars. The character which is most convenient to see is the length of the anthers. In *P. supina* they are almost as long as the glumes and thus very easy to notice.

A more detailed description (with drawing) of *P. exilis* is found in Sv. Murbeck, *Contrib. fl. nord-ouest de l'Afrique*, iii (*Act. Reg. Soc. Physiogr.*, Lund., 10), and the differences between *P. annua* and *P. supina* are treated more fully by me in an illustrated paper (in Swedish) to be published in the first number of *Botaniska Notiser* for this year. In my paper also the hybrid between *P. annua* and *P. supina* will be described and illustrated.

2/. THALICTRUM MINUS Linnaeus sensu latissimo in Britain, R. W. Butcher, *Journ. Bot.*, lxxii, 153-165, June 1934. Nos. 2/2, 2/3, and 2/4 of the *British Plant List* are replaced by the species enumerated below. The distribution figures given are incomplete and include authenticated records only.

2/2 2). ✠THALICTRUM ARENARIUM Butcher in Butch. & Strudw. *Further Illus. Brit. Pl.*, 1 (1930). Replaces 2/3 of the *British Plant List*. Distribution:—27, 49, 52, 58, 60, 62, 66, 68-70, 73, 82, 83, 88, 90, 91, 93, 94, 103, 105, 110, 111. H.—Lough Neagh.

2/2(3). ✠T. MONTANUM Wallr., *Pl. Sched. Crit.*, 258 (1822) = 2/2c. of *Br. Pl. List*.

With three varieties:—

✠Var. a. VIRENS Wallr.

✠Var. b. RORIDUM Wallr.

✠Var. c. GLANDULOSUM Wallr.

Distribution:—1, 45, 49-51, 57, 60, 65, 67, 69, 70, 73. H.—9, 28.

2/2(4). ✠T. COLLINUM Wallr., *loc. cit.*, 259 = 2/2 of *Br. Pl. List*. Distribution:—1, 6, 34, 42, 45, 49, 50, 57, 83. H.—9.

2/2(5). ✠T. BABINGTONII Butch., *loc. cit.*, 4. Distribution:—3, 19, 20, 26, 28, 29, 64.

2/2(6). T. CAPILLARE Reichb., *Fl. Germ. Excurs.*, 729 (1832) = 2/4b. of *Br. Pl. List.* Distribution:—Keltney Burn, Perthshire; possibly also Great Langdale and Coniston, Westmorland.

2/2(7). T. MAJUS Crantz, *Stirp. Austr. fasc.*, 2, 80 (1763) = 2/4 of *Br. Pl. List.* Distribution:—81, 85.

2/2(8). ✠T. UMBROSUM Butch., *loc. cit.*, 7. Distribution:—48, 49, 64-6, 69, 70, 88, 89.

2/2(9). ✠T. EXPANSUM Jord., *Obs. Pl. Crit.*, v, 6 (1847). Distribution:—Erwood, Brecon.

185/11. ✠RUBUS ALTIARCUATUS Barton and Riddelsdell, *Journ. Bot.*, lxxii, 144 (May 1934), replacing the name *cariensis*.

185/13(3). ✠R. STANNEUS Bart. et Ridd., *loc. cit.*, 231 (August 1934). A new species near *R. monensis* Bart. et Ridd. (= *latifolius* Bab.) from West and East Cornwall.

185/63. ✠R. GRISEOVIRIDIS Bart. et Ridd., *loc. cit.*, 144 (May 1934), replacing the name *micans* Rogers (=*adscitus* auct. non Genev.).

185/91. ✠R. MOYLEI Bart. et Ridd., *loc. cit.*, 144 (May 1934), replacing the name *ericetorum* Lefèv.

185/92(3). ✠R. SECTIRAMUS W. Watson, *Journ. Bot.*, lxxii, 23 (January 1934), emend. *loc. cit.*, 96 (March 1934) ex *London Naturalist*, 1932, 60-66.

185/98. R. GRIFFITHIANUS Rogers.
✠b. subspecies nova TARDUS W. Wats., *loc. cit.*, 23 (January 1934).

185/106. ✠R. WEDGWOODIAE Bart. et Ridd., *loc. cit.*, 145 (May 1934), replacing the name *mutabilis* Genev.
✠Var. e. SABRINAE Bart. et Ridd., var. nov.

185/110(2). ✠R. NUTICEPS Bart. et Ridd., *loc. cit.*, 145 (May 1934), replacing 185/110b. *fuscus* W. & N., var. *nutans* Rogers.

185/114. ✠R. MORGANWENSIS Bart. et Ridd., *loc. cit.*, 146 (May 1934), replacing the name *horridicaulis* P.J.M.
With ✠Var. b. DEVONIAE Bart. et Ridd., var. nov.

185/122(2). ✠[R. CORONATUS N. Boul.]
✠Var. b. CINERASCENS W. Wats., var. nov., *loc. cit.*, 23 (January 1934).

185/132. ✠R. RILSTONEI Bart. et Ridd., *loc. cit.*, 145 (May 1934), replacing the name *plinthostylus* Genev.

296/2. Varieties of GALIUM MOLLUGO L. in Britain, C. E. Britton, *Journ. Bot.*, lxxii, 243-51 (September 1934). The varietal names given in the *Br. Pl. List* are dropped with the exception of var. *dumetorum* (Jord.) and the following are enumerated as having been noted for Britain.

✠Var. a. GENUINUM H. Br. Glabrous, leaves oblong or elliptical-obovate, rounded at the apex, mucronate, venation apparent, panicle pyramidal.

✠Var. b. PUBESCENS Schrader. Pubescent stems, branches, lower and median leaves.

✠Var. c. PYCNOTRICHUM H. Br. Foliage yellowish-green, lower stem and lower leaves grey-felted, panicle-branches erect or ascending, flowers crowded, shortly-pedicelled, usually cream or ochraceous.

✠Var. d. ANGUSTIFOLIUM Roth. Stem erect, prostrate or ascending, glabrous. Leaves lanceolate or linear-lanceolate, gradually narrowing towards apex, with an abrupt point. Panicle broad, branches elongated, divaricate or deflexed, pedicels short, cymes crowded.

✠Var. e. NEMOROSUM (Wierzb.) H. Br. Stems very numerous, decumbent, glabrous. Leaves glabrous, lower reflexed, upper spreading, linear-oblong, acute or cuspidate, margins revolute. Midrib prominent, venation obscure. Panicle narrow, pedicels spreading, flowers crowded, white.

✠Var. f. ELATUM (Thuill.) H. Br. A large almost glabrous plant with short obovate leaves, broad panicles with spreading or erect-ascending branches and whitish flowers.

✠Var. g. PRATICOLUM H. Br. Leaves linear-lanceolate, narrowing towards acute apex, panicle well-developed, diffuse, cymes lax, pedicels 3-4 mm. long.

Var. h. DUMETORUM (Jord.) H. Br. Almost intermediate between *elatum* Thuill. and *erectum* Huds.; differing from the former by much narrower leaves and earlier period of flowering and from the latter by the much more numerous flowers, which are smaller and on shorter pedicels, and by the smaller fruit. Stems less erect, swollen at the nodes and branches more spreading.

The author points out that though enumerated as varieties, these plants may eventually prove to be subspecies or races.

320/2(2). ✠ERIGERON PSEUDO-ELONGATUS Rouy, *Fl. Fr.*, viii, 153. [Ref. No. 307], banks of R. Medway, Aylesford, W. Kent, v.-c. 16, August 24th, 1930, R. B. Ullman in Herb. P. M. Hall, determined by W. H. Pearsall. Plant 5-6 dm., lower leaves lanceolate-spathulate, obtuse, elongate, pubescent, "panicule ample."

396/1 × 2. ✠CIRSIUM ERIOPHORUM (L.) Scop. × LANCEOLATUM Scop. = × C. GRANDIFLORUM Kittel. Recorded from N. Essex, and probably also from N. Somerset and Dorset by J. E. Lousley, *Journ. Bot.*, lxxii, 171-3 (June 1934). Rouy divides *C. grandiflorum* into three forms; the N. Essex plant approaches most nearly × *C. Gerhardti* (Sch. Bip.) Rouy. It is to be noted, however, that Petrak has distinguished three races of *C. eriophorum*, the British race being *britannicum* (Petrak). Since the hybrid of this race with *lanceolatum* has not been previously recorded, it is probable that none of the names hitherto published for this hybrid is strictly admissible for the form now recorded.

527/8. VERBASCUM NIGRUM L.

✠Var. c. BRACTEOSUM Pugsley, var. nov., *Journ. Bot.*, lxxii, 278-9 (October 1934). Stems crowded with spreading, long-cuspidate or acuminate leaves or bracts almost to the apex. Fowey, Cornwall.

669/6. ORCHIS LATIFOLIA L.

✠Var. b. JUNIALIS Vermeulen, *Journ. Bot.*, lxxii, 97-101 (April 1934).

669/7x. ✠O. INCARNATA L. × O. PURPURELLA Steph. See under New County and other Records.

669/11x. ✠O. FUCHSII Dr. × O. PURPURELLA Steph., var. PULCHELLA (Dr.) Pugsl. See under New County and other Records.

674/5. NEOTINEA INTACTA Reichb. fil.

✠Var. b. STRAMINEA Pugsley, var. nov., *Journ. Bot.*, lxxii, 55 (February 1934). This name is given to that form of the species which has greenish-white or straw-coloured flowers and unspotted leaves, the specific type being restricted to the form with pink-tinted flowers and purplish blotches on the leaves.

†689/2. ✠RUSCUS HYPOGLOSSUM L. Under an elder bush. ? Bird sown. Near Rochester, W. Kent, 1934. Det. J. E. Little. See *Countryside*, summer, 1934, p. 78, and fig. in Kerner *Nat. Hist. of Plants*, i, 332.—Mrs SHEPPERD.

ABSTRACTS OF PAPERS BEARING ON THE STUDY OF THE BRITISH FLORA, 1934.

A. J. WILMOTT AND J. S. L. GILMOUR.

The authors regret that, owing to pressure of work, it has not been found possible to complete these in time for publication in this *Report*. To ensure continuity, two years' (1934-35) abstracts will be included in the next *Report*.

NOTES ON PUBLICATIONS, NEW BOOKS, ETC., 1934.

WELSH FLOWERING PLANTS: A HANDBOOK TO THE COLLECTION IN THE WELSH NATIONAL HERBARIUM. By H. A. Hyde, M.A., F.L.S., and A. E. Wade, F.L.S. Demy 8vo., pp. vii + 179 + 2 plates and 8 text figures. Cardiff: National Museum of Wales and the Press Board of the University of Wales, 1934; 5/-.

This well printed and admirably presented book supplies a long-felt need for a complete list of the flowering plants of Wales, and the authors are to be warmly congratulated on its publication. It should greatly stimulate interest in the plants of the Principality and be a valuable aid to additional knowledge of their distribution and characters. It is, however, far more than an annotated catalogue of Welsh flowering plants. It contains much additional information concerning the botany of each Welsh county, the habitats of plants, types of distribution, and an especially valuable chapter on the "Life-forms of Welsh Flowering Plants," with a brief but useful illustrated description of the chief characteristics of Professor C. Raunkiaer's various groups and sub-divisions of classification.

We are informed that "Our distributional data have been compiled entirely independently of the *Comital Flora*, and we have not regarded entries in that work as valid county records unless they have been corroborated by other evidence." If the authors had also adopted the same criterion in regard to the records of J. F. Robinson (in *Top. Bot.*) they would have been on far safer ground. On the whole the nomenclature is quite sound but we noticed two names that should not have been used. *Carex inflata* Huds. is a synonym of *C. versicaria* L., not of *C. rostrata* Stokes. The name *Potamogeton mucronatus* Schrad. has no legitimate status. It is given first in Roemer & Schultes *Syst.*, iii, 517 (1818), but its publication there is simply that of an unidentified *nomen nudum*. At the end of their treatment of *Potamogeton* the authors add two unknowns, one of them "Quid *P. mucronatus* Schrad." This publication of the *name only*, gives it no status. It is next cited from Reichenbach *Icon. Fl. Germ. Helv.*, vii, 15. t. xxiv (1845); but Reichenbach definitely maintained for this plant the name *P. compressus* and only gave *P mucronatus* Schrader as a synonym. A name taken up merely as a synonym fails of valid publication and should give way to the properly published *P. Friesii* Rupr. (1845).

THE FLOWERING PLANTS AND FERNS OF CARDIGANSHIRE. By J. H. Salter, D.Sc., formerly Professor of Botany at Aberystwith University College. Cardiff: University of Wales Press, 5/-.

The outstanding features of this volume are the excellence of paper, type and format: the rounded corners and liberal margins help to complete a most pleasing book.

Prof. Salter has rendered very valuable service by gathering into one volume all the existing scattered records of Cardiganshire plants. He admits that the present list makes no pretence to being a complete Flora of the county, but it will certainly be extremely useful as a basis for such, and will be greatly appreciated by visiting botanists. The members of this Society will be glad to assist in supplying authentic records of plants not included in this volume.

THE GRAMINEAE: A STUDY OF CEREAL, BAMBOO, AND GRASS. By Agnes Arber, M.A., D.Sc. Roy. 8vo., pp. xvii + 480, frontispiece + 212 text figures. Cambridge: at the University Press, 1934; 30/- net.

Dr Arber's scholarly treatise is an outstanding achievement which it is difficult to praise too highly. In the Preface we are reminded that "Man in his primitive state thought of plants merely in connection with himself and his needs, and it was only gradually that this egocentric interest matured into the objectivity of pure botany. This book follows a corresponding sequence, it begins with the study of the grasses in relation to man and the more strictly botanical aspect is treated as developing out of the humanistic." In the reviewer's judgment the chief charm of the book lies in its skilful blending of the literary and humanistic elements with the scientific in working out this original conception. It is of exceptional interest throughout, written in a fascinating manner and abounding in stimulating suggestion. The abundant and excellent illustrations are a special feature and the presentation is of the high standard we expect from the Cambridge University Press. We have seen no book which makes a stronger appeal to lovers of Nature and to those who are interested in man's growing knowledge of it.

BOTANY: A SENIOR TEXT-BOOK FOR SCHOOLS. By Prof. D. Thoday, M.A., Sc.D., fifth edition, 1935. Cambridge University Press, 7/6.

The fact that a fifth (thoroughly revised) edition of this book is called for, speaks well for its popularity and value. It has long enjoyed a high reputation in secondary schools and there is no book I can more warmly commend to the notice of adults desirous of having a reliable text-book of botany on their shelves. The text is written in language of excellent choice and combines scientific accuracy with commendable lucidity of expression. Nothing could be finer—for example—than the three chapters (xv-xvii) devoted to seeds and seedlings; chapter xvii on "the conditions of germination and growth" is especially good.

The general format of the book is extremely pleasing, the type is singularly clear, the spacing and margins generous and the illustrations admirably chosen. Any of our members in need of an authoritative and modern presentation of the fundamental facts in the life-history of a plant cannot do better than secure this excellent volume.

FLORA OF MORAY, INCLUDING FLOWERING PLANTS, CONIFERS, FERNS, MOSSES, FUNGI AND ALGAE. By James J. Burgess, M.A. At the "Courant and Courier" Office, Elgin, 1935; price 5/- (postage 6d).

This is a small, admirably arranged and well-printed Flora which will be in much demand by visitors to this most interesting county. At the same time, it will be valuable for reference to all those whose daily occupation demands considerable knowledge of nature—teachers, gardeners, foresters and farmers. There is a notable " Foreword " by the Prime Minister on " this fine achievement connected with my native county." Both in letter and spirit it is excellent. In the Flora itself the distribution of a species is indicated by capitals denoting the parishes in which it occurs. There is an interesting article entitled " Notes on some of the Rarer and More Interesting Species," by the Rev. Geo. Birnie. An extremely valuable paper on the " Coniferae in Morayshire," by Mr Peter Leslie, M.A., B.Sc., deals with Biology, Afforestation, Uses and General Notes—a scholarly and authoritative contribution. The same author is responsible for an admirable " Review of the Fungi " and brief " Notes on Freshwater Algae." A catalogue of the " Mosses of Moray " is given by the Rev. Geo. Birnie, B.D.

The members of the Moray Field Club are to be congratulated on the completion of so valuable and readable a record of their labours at so low a price.

ENGLISH NAMES OF OUR COMMONEST WILD FLOWERS. Part II. Arranged and Explained by Robert Fisher, M.A., late Canon of York. Demy 8vo., pp. viii + 344. Arbroath: T. Buncle & Co., 1934; 6/-. [Parts I and II bound in one volume (cloth), 14/6.]

This second and concluding part includes many well-known plants which, though not so frequent in every county as those in Part I, are yet quite common and widely distributed. Readers will discover much hidden treasure among these pages and be astonished at the number of popular names claimed by some of the species. Cuckoo-pint is only one of the 150 names given to *Arum maculatum* L., while *Stellaria Holostea* L., *Digitalis purpurea* L., and *Orchis mascula* L. claim over 130 respectively. It is most interesting to trace through these names—often singularly apt—the characters which have most appealed to the people and earned for the flowers their descriptive names. The book is a mine of information and represents an enormous amount of labour and critical research. We wish the second part unqualified success.

THE WILD FLOWER MAGAZINE. This admirable publication continues to afford abundant evidence of the widespread and growing interest in our native plants. The lists of wonderful finds of rare flowers by the members are surprising and in many cases of considerable scientific value in confirming or extending our records of the distribution of British plants. Even more remarkable than the records of plants seen is the testimony on every page to the great joy the flowers and their finding have afforded. " We old stagers " too can revel in the recollection of happy memories recalled by the names of persons, plants and places here set forth. We have the warmest commendation for the excellent work the Wild Flower Society is doing.

OBITUARIES.

Thomas Jackson Foggitt. The name of Foggitt has been a familiar one to three generations of field botanists, and very intimately associated with the long history of the B.E.C. Members will recall how the Report for 1932 contained a special article by the subject of this obituary on his own personal recollections, nearly seventy years before, of the time when the headquarters of the Society were in Thirsk, and its prime movers those famous friends John Gilbert Baker and the writer's father, William Foggitt, F.L.S. In this paper he recalled the wonderful energy of those early botanists to whom a ramble of forty miles was all in the day's work, and gave his own childhood's recollections of the great fire at the Baker's premises which destroyed all Gilbert's specimens and the copies of his just published "Flora of the North Riding," and was really responsible for the removal of himself and the Society to London.

Thomas Jackson, second bearer of this name, for he was called after his grandfather, himself a field botanist of no mean attainments, was born on March 2, 1858, in Thirsk, where he lived the whole of his life. The Foggitts were, and still are, hereditary chemists, tracing their origin to a certain Italian, native of Foggia, who came to Cleveland in Yorkshire during the 16th century in connection with the alum trade, and was excommunicated by the Pope, according to family legend, for so doing. For well-nigh a hundred years they have been chemists, both wholesale and retail, in this small but important Yorkshire town, and no name is better known or more widely respected in the North Riding than "Foggitts of Thirsk." Almost inevitable the calling of chemist leads to botany, and this was especially so in days when chemists themselves prepared many of their own drugs. Such times are now long past, but Thomas Jackson the second still belonged to them in his youth, and as a young man would go out to gather the dandelion roots and foxglove leaves, etc., needed for the concoctions he made with his own hands for the medicines dispensed.

So in an atmosphere of systematic botany he was born and bred, and before he was nine years old he began to list, press and mount the specimens he found in the wonderfully fertile botanical neighbourhood that lay around him, and so laid the foundation of the Herbarium which was his absorbing hobby to the day he died. Educated at Wharfedale College, Boston Spa, he qualified as a chemist in Edinburgh in 1880, his work there being enlivened by long tramps over the Pentland Hills and the moors of Scotland that he ever afterwards loved so dearly. Then he entered the family firm as partner, and henceforth for many years his life was one of most strenuous business activity; for hours were long in those days, his father's health broke down, there was a large family of younger brothers and sisters to provide for, and early and late he laboured with the extreme conscientiousness, unsparing industry and selfdenial which were ever his strongest characteristics. Little enough leisure came his way, but one day, or part of it, a week he claimed, and this he spent in long, long botanical tramps over the Hambleton Hills, up the Yorkshire Dales, in Teesdale, and the Lakeland mountains when he could win as far, and soon there was not a floral corner of Yorkshire or Westmorland, and further, which he had not visited. Later, in summer holidays, he wandered further afield; on two occasions as far as the alps of Switzerland and the Tyrol. But mainly he explored the wild-flower haunts of his own country. Long before he possessed a motor car of his own he had covered each county of England; and because every moment of his time was filled with duties he would not neglect, he took the most extraordinary day and night journeys by train—to Cornwall or Devon or Kent or the Channel Isles and back again, often for a single flower. Ireland he knew well, from end to end, and Wales, and the treasures of the Kerry mountains and the Snowdon range were visited again and again. But always the hills of Scotland attracted him the most, and a year which did not see him upon them he counted almost as a year lost. His last ascent of Ben Lawers, only four years ago, he reckoned to be his thirtieth. The Clova glens and corries, Lochnagar, Ben Lui, Ben Nevis, Ben Wyvis, Skye, the Sutherland and Ross-shire mountains, he knew intimately, and, moreover, he found practically all their rarities for himself, a joy which the " spoon-fed " of the present day too rarely experience. Botanising off the beaten track entailed adventures, too, in those days, and to be lost for many hours in mist among the precipices or to sit up all night on a broken chair before a crofter's peat fire were events to dwell on with amused recollection—afterwards!

Foggitt was a splendid hunter and he never forgot a locality, and soon he became known to an ever widening circle of botanists for the knowledge he possessed and which he was ever ready to share, taking the most infinite pains in so doing. With the exception of Doctor Druce, it can fairly be claimed that he had more knowledge of wild-flower localities than any other man in Great Britain; while his friends comprised almost every well-known systematist of the last thirty years and more; all glad to claim his help and his friendship and to share his hospitality. " Ask Foggitt—he'll help you," was almost a by-word among them, and he *did* help, and no man knew, least of all himself, how much he did nor how many botanical letters he wrote and received every year. Modest and self-effacing to a fault, he kept his own attainments entirely in the background. If he made a County Record he never published it; if a discovery was his he smilingly allowed some other member of the party to claim it. Such matters were of no importance to him, but he loved the wild-flowers themselves and the haunts where they grow with a passion that only increased with his years, and he watched with delight his Herbarium (entirely of his own collecting) become ever more perfect and complete.

Thus it follows that proof is lacking of much he might have claimed. He always believed that he re-found Don's original locality for *Carex ustulata* on Ben Lawers itself, and that he discovered *Carex Sadleri* on the Breadalbane Range when it had only been previously known in Aberdeenshire. Certainly he recognised the so-called "Mystery Orchis" (*Orchis latifolia*, var. *eborensis* var. nov.) in the Rievaulx woods many years before anybody else—to venture on but three instances, diffidently since he is not here now to confirm or, more likely, to deny lest he perchance took credit that another could claim.

Foggitt remained a bachelor until middle life and his first, devoted wife, Fanny Sophia Boddy, died six years only after their marriage. Four years later, in February 1929, he married again—Gertrude, daughter of the late Rev. J. M. Bacon, who survives him, and their few years together were very happy ones. They shared their botanical tastes and by Doctor Druce's special desire they were made, at his death, joint Treasurers of the B.E.C. A very severe illness at the end of 1931 left Foggitt an invalid for some while; but he recovered wonderfully, and enjoyed a last glorious summer of flower hunting, the end coming almost suddenly on October 30 of last year. Perhaps his epitaph cannot be more gracefully worded than in a letter Lady Victoria Russell wrote on November 9 to "The Times," which kindly allows the quotation:—

"May I add a word to your sympathetic notice of the late Mr T. J. Foggitt on some of the qualities that endeared him to his friends? His kindness to botanists was unfailing. He and his wife kept open house not only for learned and distinguished professors but also for the many amateur beginners who were lucky enough to know them. All delighted in the welcome they received on a few days' visit to see the rare plants of the neighbourhood, to look at the beautifully kept specimens in his great collection, and to receive advice and directions for further expeditions. Trivial questions and elementary observations were answered without a trace of condescension but always with sympathetic interest. Each one will remember him with affectionate gratitude, and the deepest sympathy for the companion who so whole-heartedly shared his tastes and prolonged his life by her devoted care."

Thomas Jackson Foggitt's name will last long on the thousands of the beautifully mounted specimens now in the Natural History Museum and elsewhere, and remain as a fragrant memory to the many friends who recall his gentle, helpful, lovable presence.

MAJOR ROBERT ORME, who died August 1934, was born in Dublin in 1865, son of Robert Orme, Barrister, of Bray, Co. Wicklow. His love of wild flowers he inherited from his mother, with whom, as a boy, he had many happy hunting days in holiday time, more particularly in Switzerland, where his knowledge of the alpine flora became considerable. Trained originally for an electrical engineer, he subsequently, following the wish of his parents, turned his attention to the Bar, took his degree of Bachelor of Law at Dublin University and practised at the Four Courts until he married and came to live in England. At the outbreak of war he joined the Royal Flying Corps, as it was then called, at Farnborough, and was the first Wireless Officer, having experimented with Wireless from its very inception. He created a large Wireless School for the instruction of Flying Officers which, as a branch of the Royal Air Force, he commanded for a while, first at Brooklands and afterwards at Biggin Hill, Kent. For his services he was given the permanent rank of Major at the end of the War.

A keen sportsman, shooting, tennis, golf and billiards were his recreations; but his botanical bias was ever present, and as he grew older and had more leisure he gave more and more time to the pursuit he specially loved. Living latterly in the happy hunting ground of South Devon, and sharing with his wife his flower rambles and discoveries, he fast widened his knowledge and circle of botanical friends. Particularly quick-eyed, he noted many interesting records, and his name may often be found in the B.E.C. Reports. Dr Druce writes, in his survey of the last summer of his life, how in July 1931 " Major Orme kindly took us to the headland where *Campanula persicifolia* appears to be a native, and showed us the New Zealand adventive *Acaena anserinifolia* Dr. well naturalised."

But as in the case of his great friend W. D. Miller, whom he survived so short a time, it will be for his unfailing kindness and help to the botanists themselves that Major Orme's name will long be held in affectionate regard. To the tyros of the Wild Flower Society (for which he was long a Branch Secretary) as well as to the veterans of the B.E.C., he gave unsparingly of his time and wide knowledge. A man of much personal charm, he endeared himself to all, and many a member even among those who knew him but slightly, will have pleasant memories of happy instructive hours spent in his genial and inspiring company.

JOHN FRASER, V.M.H., F.L.S. On 24th January 1935, John Fraser died in Charing Cross Hospital from pneumonia following injuries received through being accidentally knocked down a week earlier by a cyclist, while he was crossing Kingsway.

Fraser was born on 31st January 1854, at Newdeen, fifteen miles from Fraserburgh, Aberdeenshire, and was the eldest son of a family of seven. He commenced his horticultural and botanical career in Scotland in 1874. In February 1880 he joined the staff of the Royal Horticultural Society, at the latter's old gardens in Chiswick. In 1882 he entered Kew and was for a time in charge of the Rock Garden and afterwards of some of the glasshouses. In May 1885 he gave up his official connection with Kew and commenced work in the Jodrell Laboratory on behalf of Sir John Lubbock, afterwards Lord Avebury. It is known, although perhaps not so widely as it should be, that much, if not most, of the detailed research underlying Lord Avebury's classical publications on seedlings, seeds, buds, stipules, pollen, and other botanical subjects was done by Fraser, whose connection with Lord Avebury lasted for many years. He became Assistant Editor of the "Gardening World" in 1887 and was Editor of this paper from 1895 to 1909. He wrote or contributed to many horticultural works, including *Thompson's Gardeners' Assistant*, *Cassell's Popular Gardening*, *Cassell's Popular Science*, and the 1917 edition of *Johnson's Gardener's Dictionary*. He was also a regular (and often anonymous) contributor to many horticultural and botanical journals. He had an intimate acquaintance with many groups of horticultural plants and especially with potatoes and the genus *Pelargonium*.

In addition to his extensive practical horticultural experience and his work for Lord Avebury, Fraser had a wide yet detailed knowledge of the British Flora, both as a field collector and observer and as a herbarium investigator. He was a great walker and tramped many hundreds of miles every year in search of botanical treasures, often going for the whole day with no more food than a piece of bread in his pocket. He explored many parts of Scotland, and knew the country to the south of London most intimately. In his later years he specialised on the taxonomically very difficult genera *Mentha* and *Salix*, and most recently returned to a study of seedlings. His published accounts of British mints and British willows are evidence of a clear logical mind and of considerable descriptive ability.

Fraser is buried in the Richmond, Surrey, cemetery. His fine herbarium collections of about nine thousand sheets, together with his manuscript notebooks, have been presented, at his written desire, to the Royal Botanic Gardens, Kew, by members of his family. There are many valuable Scottish gatherings amongst his specimens, and the flora of Surrey is particularly well represented. His collection of seedlings of British plants, numbering several hundred sheets, must be unique, and will be of great value in future investigations of life-histories. His horticultural services were recognised by the Royal Horticultural Society when the Victoria Medal of Horticulture was conferred on him by the Council in 1922, and the Veitch Memorial Medal in 1929. He was elected a fellow of the Linnean Society in 1889.

Our old friend was of a very modest and retiring character, and though willing and able to talk at length on a great variety of topics, especially those connected with plant-life, he was very reticent regarding his personal affairs. He enjoyed the freedom which his mode of life allowed him and with a happy, contented outlook found the most intense pleasure in his studies. Amongst his books were found three volumes of poems of varying length written in his small legible handwriting. These date from 1892 to 1924, and are obviously of varying merit. Though high authority has considered they should remain in manuscript at present, perhaps fifty or a hundred years hence a " new poet " will be unearthed amongst the documents housed at Kew! Certainly John Fraser had a poet's soul, unknown to and unsuspected by his botanical friends.—W. B. TURRILL.

EARL BUXTON, one of the last of the distinguished men who held parliamentary office under Gladstone, died at his home, Newtimber Place, Hassocks, Sussex, on October 15th, 1934, aged 80 years. He had a long record of public service. He entered Parliament more than 50 years ago and as Sydney Charles Buxton was Under-Secretary for the Colonies from 1892 to 1895. From 1905 until 1910 he was Postmaster-

General, with a seat in the Cabinet. In 1910 he became President of the Board of Trade and continued in that office till 1914, when he was made a Viscount and became High Commissioner and Governor-General of South Africa. He served in this position for six years and was thus in the dominion throughout the period of the Great War. It has been recorded of his term of office in South Africa that " he continued to add new lustre to the Imperial doctrine and to consolidate British interests without derogating from those of the Dutch." In 1920 in recognition of his services in South Africa he was created an Earl. During his remaining years in England he lived quietly but his health was not very good. A damaged bone in his leg never recovered completely and ultimately, when he was 77, necessitated amputation of the whole limb. Earl Buxton is survived by the Countess and his daughter, Lady Alethea Eliot, both of whom we are glad to still include as members of this Society. Earl Buxton has always shown a keen and intelligent interest in the study of natural history and it will be remembered that he presided at our Conversazione in 1932 and has upon many other occasions extended his kindly offices to our members.

JOSEPH EDWARD LITTLE, M.A. On Friday, 18th January 1935—a few minutes after revising an article on " The migratory habits of some British Orchids—this distinguished member of our Society collapsed and died. Mr Little was born in 1861, educated at Tonbridge and Lincoln College, Oxford, where he took his M.A. in 1885. He was appointed Headmaster of Hitchin Grammar School in 1889 and retired in 1897. Afterwards he did temporary work at Rugby and Haileybury, but the greater part of his time was devoted to botany, which he had made a lifetime study. He was a member of the Hitchin Natural History Club, and President in 1891; Recorder in Botany for the Hitchin and District Regional Survey Association, and assisted materially in the compilation of the Cambridge Natural History. He was a fine and fastidious classical scholar and frequently assisted us in obscure Latin constructions. He was also deeply interested in Philology, especially in the derivation and meaning of place names. He is survived by his wife and daughter, Miss Katharine Little, who was closely associated with him in his botanical work and is a member of the Council of the Hitchin and District Regional Survey Association.

Eloquent tributes to the variety and extent of his scholarship have been paid by many writers but we are more concerned to put on record our great indebtedness to him as a critical and field botanist of exceptional competence. It is to members of both Exchange Clubs in this country that Mr Little's name is most familiar. He was a great collector of representative and critical plants, and most herbaria—both public and private—contain sheets with his well-known labels. His own valuable herbarium has gone to the Cambridge University, where it will be consulted with profit by students for generations to come. Not only was his contribution of plants so extensive and valuable but his critical comments on the plants distributed by others are among the very best of their kind, and fortunately are on permanent record in our reports. While his general knowledge of the British Flora was very great, it was particularly so in the case of certain genera of trees—*Salix*, *Populus*, *Pyrus*—and also in *Carex*. On these his determinations and notes carried great weight. In collaboration with the late Dr Drabble he contributed an article to the *Journal of Botany* in 1931 on "The British Veronicas of the *agrestis* group." Many of us who have been privileged to enjoy his correspondence for so long feel a personal sense of loss at his departure and are glad to have the opportunity of testifying to his generosity and self-sacrificing service for others.

GUSTAF ADOLF HUGO DAHLSTEDT, 1856-1934. Born February 8th at St Lars parish, Östergöthland, Sweden; died at Mörby, near Stockholm, on October 2nd, 1934, aged 80. He was educated at Uppsala, where he took his degree in 1875 and became doctor of honour in connection with the celebration of Linné in Uppsala University. He was made a Knight of the Vasa Order in 1925. He was also an honorary member of the Societas pro Fauna et Flora fennica, Hâlsingfors.

NEW COUNTY AND OTHER RECORDS.

2/2. Thalictrum minus L. Kennack, v.-c. 1, J. D. Grose.

3/2b. Anemone nemorosa L., var. purpurea DC. Very dark form of this in a wood near the High Rocks, Tunbridge Wells, v.-cs. 14 and 16, J. P. M. Brenan.

3/2c. A. nemorosa L., var. caerulea DC. Still in Hurst Wood, Tunbridge Wells, v.-c. 16, (whence it was recorded by Whitwell and Reeves in 1870,) J. P. M. Brenan.

5/1. Myosurus minimus L. Swanwick, S. Hants, v.-c. 11, P. M. Hall.

6/3a. Ranunculus acer L., var. multifidus DC., f. tomophyllus (Jord.). Wicken Fen, Cambs, Dr A. H. Evans.

6/6. R. Lingua L. Gunwalloe, v.-c. 1, the only locality, J. D. Grose.

*6/12. R. ophioglossifolius Vill. Near Cheltenham, v.-c. 33, J. D. Grose.

*6/20b. R. fluitans Lam., var. Bachii Wirtgen. Blakeney, W. Glos., v.-c. 34. Teste Pearsall. In full flower, 16th July 1934, petals narrower, non-contiguous. Submerged leaves sub-sessile; segments few, short, obviously tapering, Miss M. S. Campbell, Lady Davy, and Miss M. Brown.

6/21. R. circinatus Sibthorp. Pond, Saunton sandhills, Braunton, N. Devon, 29th May 1915. Leg. W. P. Hiern. Three sheets in Hb. Hiern at the Museum, Exeter, W. H. Pearsall.

6/22. R. trichophyllus Chaix. Winchfield, N. Hants, v.-c. 12, Lt.-Col. G. Watts.

*6/24. R. heterophyllus Weber, var. trifidus Pears. Loch Ashie, Inverness, v.-c. 96, Miss E. S. Todd.

*6/29. R. tripartitus DC. Pond at Belstone, near Okehampton, N. Devon, v.-c. 4, W. Keble Martin. A most interesting extension of the northward distribution of this species. The specimens sent were in good fruiting condition, W. H. Pearsall. Predannack, Cornwall, v.-c. 1, J. D. Grose.

6/31. R. Lenormandi F. Schultz. Lundy Island, 1st September 1890 and 11th June 1884. Leg. W. P. Hiern, in Hb. Hiern at the Museum, Exeter, W. H. Pearsall.

9/1. Helleborus viridis L. Wroughton, v.-c. 7, probably wild here, J. D. Grose.

9/2. H. foetidus L. Old Park, Dover, v.-c. 15, J. P. M. Brenan; Sheepscombe, v.-c. 33, J. D. Grose.

11/1. Aquilegia vulgaris L. Near Lingfield, distr. ix, Surrey, W. H. Wilding.

17/1. Berberis vulgaris L. Edge of Caldecote Fen, W. Norfolk, 1934, K. D. Little; Merton, N. Devon, v.-c. 4, Miss Ching; *near Achnacloich, Argyll, v.-c. 98, Miss M. Martin.

19/1. Nuphar lutea Sm. Taff's Well, Glamorgan, v.-c. 41, E. Vachell.

*20/1. Castalia alba (L.) Link. In a quarry pool near Fort Le Marchand, Guernsey, J. P. M. Brenan.

21/2. Papaver Rhoeas L., var. caudatifolium Fedde. Hitchin, Herts, H. Phillips.

21/3. P. dubium L. Hitchin, Herts, H. Phillips.

†28/1. Eschscholzia Douglasii Walp. Waste-heap, Letchworth, Herts, H. Phillips.

32/5. Fumaria Boraei Jord. Campbeltown, Argyll, v.-c. 101, Mrs Macalister Hall.

32/5d. F. Boraei Jord., var. britannica (Pugsl.), det. H. W. Pugsley. Roadside hedge near Wareham, Dorset, v.-c. 9, P. M. Hall.

32/9. F. Bastardi Boreau. Porchester, S. Hants, v.-c. 11 (det. H. W. Pugsley), P. M. Hall; Llangennith, Glam., v.-c. 41, A. L. Still; *Killean, Kintyre, Argyll, v.-c. 101, Mrs Macalister Hall.

32/9b. F. Bastardi Bor., var. hibernica Pugsl. Campbeltown, Kintyre, Argyll, Mrs Macalister Hall.

32/10d. F. officinalis L., var. Wirtgeni Hausskn. A rampant form, St Cross, Winchester, S. Hants, v.-c. 11 (det. H. W. Pugsley), P. M. Hall.

32/11. F. micrantha Lag. Near Owslebury, S. Hants, v.-c. 11, P. M. Hall and H. W. Pugsley; near Greywell, N. Hants, v.-c. 12, Lt.-Col. G. Watts.

33/1. MATHIOLA INCANA Br. Freshwater, v.-c. 10, J. D. GROSE.

33/2. M. SINUATA Br. Saunton Cliffs, N. Devon, v.-c. 4, H. S. REDGROVE.

36/3. BARBAREA VULGARIS Br. A shade form varying from type in the direction of *B. arcuata*, possibly var. *transiens* Dr.?: side of ditch, Chark Common, S. Hants, v.-c. 11, P. M. HALL.

39/1. CARDAMINE PRATENSIS L. Bradwell Dales (fen), East Suffolk, v.-c. 25. Ninety-seven plants bearing only "double" flowers, May 28th, 1934, E. A. ELLIS.

*39/3. C. IMPATIENS L. A few plants discovered by Miss M. E. Urton are growing in the crevices of an old roadside wall at Riding Mill in the Tyne valley, v.-c. 67. This is the first record for Northumberland where, at present, the plant can only be deemed adventive. Its nearest natural stations are among the limestone hills of West Yorkshire, G. W. TEMPERLEY.

39/4. C. FLEXUOSA With. Sallow-carrs at Clippesby, Hoveton and Surlingham, East Norfolk, v.-c. 27, E. A. ELLIS.

†42/6. ALYSSUM CALYCINUM L. Near Brandon, W. Norfolk, v.-c. 28, H. S. REDGROVE.

†47/2. HESPERIS MATRONALIS L. West Wycombe, Bucks, v.-c. 24, Miss E. PUGH.

†49/2. SISYMBRIUM SOPHIA L. Waste ground, Wotton, Surrey, v.-c. 17, J. G. LAWN.

†49/4. S. COLUMNAE Jacq. Waste ground, Wotton, v.-c. 17, J. G. LAWN.

†49/5. S. IRIO L. Portishead siding, v.-c. 6, A. L. STILL.

*52/1. CAMELINA SATIVA Crantz. Cultivated ground at Bromham, near Devizes, N. Wilts, v.-c. 7, Miss P. LEAKE.

60/1. CORONOPUS DIDYMUS Sm. North and South Denes, Gt. Yarmouth, v.-c. 27, spreading on waste ground on the outskirts of the town, E. A. ELLIS.

61/3. LEPIDIUM DRABA L. Near Folkestone, Viscountess GLADSTONE; shore at Worthing, W. Sussex, v.-c. 13, E. B. WILKINSON; Marazion, v.-c. 1, and Charney Bassett, v.-c. 22, J. D. GROSE.

61/4. L. RUDERALE L. Sea-coast at Brightlingsea, Essex, REGINALD A. SLADER.

61/7. L. Smithii Hooker, var. leiocarpum (Thell.) Dr. West Mount, St Helier's, Jersey, H. Phillips.

†61/22. L. densiflorum Schrad. Waste heap, Royston, Herts, H. Phillips.

*64/2. Thlaspi perfoliatum L. Oaksey, Wilts, v.-c. 7. Removes the query in *Comit. Fl.*, J. D. Grose.

†64/5. T. alliaceum L. Piglesworth Hill, near Andoversford, v.-c. 33, Miss L. Abell.

66/1. Teesdalia nudicaulis L. Lyminge Wood, E. Kent, v.-c. 15, Viscountess Gladstone.

67/1. Hutchinsia petraea Br. Pennard Castle, Gower, v.-c. 41. In sandy turf, and finer plants than those on the limestone above, A. L. Still.

†70/1. Neslia paniculata Desv. Casual near chicken-run, Glynde, E. Sussex, v.-c. 14, Miss K. Pickard.

†74/2. Bunias orientalis L. Woldingham, Surrey, v.-c. 17, H. S. Redgrove.

87/2. Helianthemum Chamaecistus Mill. A single plant with pale rose-pink petals, Collingham Common, Mid-West Yorks, v.-c. 64, P. M. Hall.

87/4b. H. canum Baumg., var. vineale (Pers.). Cronkley Fell, Teesdale, v.-c. 65, H. S. Redgrove.

All these Violet records have been seen by me, mostly in the fresh state.—P. M. Hall.

88/3. Viola silvestris Lam. West Grimstead, S. Wilts, v.-c. 8, Miss Gullick and P. M. Hall; Mathon, Hereford, v.-c. 36, F. M. Day; Tanworth in Arden, Warwick, v.-c. 38, comm. F. M. Day.

88/3. V. silvestris Lamarck, f. pallida. Brockwood, The Downs School, Colwall, Herefordshire. This record sent in last year should be cancelled. Mr P. M. Hall has come to the conclusion it is a very pale flowered form of *V. Riviniana*, F. M. Day.

88/4. V. Riviniana Reichb., ± typical. West Grimstead, S. Wilts, v.-c. 8, Miss Gullick and P. M. Hall.

88/4b. V. Riviniana Reichb., var. diversa Greg. Landford, S. Wilts, v.-c. 8, Miss Gullick; Bearswood Common, Cradley, Hereford, v.-c. 36, F. M. Day.

88/4e. V. Riviniana Reichb., var. nemorosa N.W. & M. Wood near Hadlow Down and another form, probably this, near Mayfield, E. Sussex, v.-c. 14, A. H. Wolley-Dod.

88/4f. V. Riviniana Reichb., forma villosa (N.W. & M.). Near Cork's Pond, Matfield, West Kent, v.-c. 16, W. H. Pearsall; Bearswood Common, Cradley, Hereford, v.-c. 36, F. M. Day.

88/5b. V. rupestris Schmidt, var. arenaria (DC.) Becker. Fruiting freely, Widdy Bank, Durham, v.-c. 66, P. M. Hall and W. A. Sledge.

88/6b. V. canina L., var. ericetorum Reichb. With white flowers, Shapwick, N. Somerset, v.-c. 6, Miss Miller; Jevington Downs, E. Sussex, v.-c. 14, A. H. Wolley-Dod; on chalk down, Inkpen Hill above Riever Wood, Berkshire, v.-c. 22, P. M. Hall.

88/6b.× V. canina L., var. ericetorum Reichb. × V. Riviniana Reichb., var. diversa Greg. West Grimstead, S. Wilts, v.-c. 8, Miss Gullick and P. M. Hall; Jevington Downs, E. Sussex, v.-c. 14, A. H. Wolley-Dod; on chalk down, Inkpen Hill above Riever Wood, Berkshire, v.-c. 22, P. M. Hall.

88/7. V. lactea Sm. Hook Common, v.-c. 12, A. L. Still.

88/7.× V. lactea Sm. × Riviniana Reichb. Landford, S. Wilts, v.-c. 8, Miss Gullick; Stoborough Heath, near Wareham, Dorset, v.-c. 9, P. M. Hall and J. E. Lousley.

88/8b. V. odorata L., f. imberbis (Leight.). Crondall, N. Hants, v.-c. 12, Lt.-Col. G. Watts; Applegarth, Matfield, West Kent, v.-c. 16, W. H. Pearsall.

88/8d. V. odorata L., var. dumetorum (Jord.). (f. imberbis). Firle Plantation, E. Sussex, v.-c. 14, A. H. Wolley-Dod. A form received from Glamorganshire from Miss Vachell was almost pure white without the usual purple blotches on the reverse of the upper petals; this came from the locality from which the var. immaculata Greg. was recorded. The latter is a very different plant and the record of its occurrence in Glamorgan is probably an error.

88/8g. V. odorata L., var. sulphurea (Car.) R. & F. Appeared spontaneously in a garden at Budleigh Salterton, S. Devon, v.-c. 3, Major R. Orme.

88/8h. V. odorata L., var. subcarnea (Jord.). Near Marlborough, N. Wilts, v.-c. 7, Mrs Wedgwood; (f. imberbis) Firle Beacon, E. Sussex, v.-c. 14, A. H. Wolley-Dod.

88/9.× V. HIRTA L. × V. ODORATA L. With white flowers, Cradley, Hereford, v.-c. 36, F. M. DAY.

88/9j. V. HIRTA L., var. VARIEGATA Greg. Near Newton Abbot, S. Devon, v.-c. 3, F. M. DAY. One plant bore peloriate flowers, each of the five petals being spurred; Crondall, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

88/11. V. PALUSTRIS L. West Grimstead, S. Wilts, v.-c. 8, Miss GULLICK and P. M. HALL.

All the gatherings of Pansies recorded here have been seen by Mrs Drabble and the names have been agreed by her and P.M.H.

88/15c. V. VARIATA Jord., var. VECTENSIS (F. N. Williams). Calbourne, Isle of Wight, v.-c. 10, P. M. HALL. The discovery of a pansy with large yellow flowers in the Isle of Wight this year was of particular interest in view of the late Dr Drabble's remark (*Rep. B.E.C.*, 1931, 738) that the only *tricolor* pansy seen in the Island since the original gathering on which Williams based his description of *vectensis* was one specimen of *V. Lejeunei.* Mrs Drabble has seen my gathering and says: "I should think it is *vectensis*," and referring to one particular specimen says: "This specimen resembles very closely a plant sent by Mr J. E. Little from *White Hill, Hitchin, Herts, May 15th 1931." Dr Drabble wrote of this plant: "*V. vectensis*, I think." This would appear to be a new record for v.-c. 20, P. M. HALL.

*88/17. V. MONTICOLA Jord. Near Westbourne, West Sussex, v.-c. 13, P. M. HALL.

88/19. V. LEJEUNEI Jord. Longcoombe, near Polperro, East Cornwall, v.-c. 2, F. RILSTONE; *Culloden Moor, East Inverness, v.-c. 96, Miss E. S. TODD; *Killean, Kintyre, Argyll, v.-c. 101, Mrs E. M. MACALISTER HALL.

88/21. V. ORCADENSIS Drabble. *Gillock, Caithness, v.-c. 109, Miss E. S. TODD. Not determined with certainty but Mrs Drabble suggests that this gathering is a slender updrawn form of this species.

88/22. V. AGRESTIS Jord. Station sidings, Marazion, West Cornwall, v.-c. 1, Miss E. S. TODD; *Killean, Kintyre, Argyll, v.-c. 101, Mrs E. M. MACALISTER HALL.

88/23. V. SEGETALIS Jord. *Killean, Kintyre, Argyll, v.-c. 101, Mrs E. M. MACALISTER HALL.

88/24. V. OBTUSIFOLIA Jord. *Killean, Kintyre, Argyll, v.-c. 101, Mrs E. M. MACALISTER HALL; *near Wareham, Dorset, v.-c. 9, P. M. HALL.

88/27. V. ANGLICA Drabble. *Bere Farm, Wickham, and between Exton and Beacon Hill, S. Hants, v.-c. 11, P. M. HALL; *Harewood, near Andover, N. Hants, v.-c. 12, P. M. HALL.

88/28. V. DESEGLISEI Jord. *Near Longwood Dean, S. Hants, v.-c. 11, P. M. HALL; N.C.R. for the type, but the var. *subtilis* (Jord.) has been previously recorded.

88/28b. V. SUBTILIS Jord. Near Longwood Dean, S. Hants, v.-c. 11, P. M. HALL; Harewood, near Andover, N. Hants, v.-c. 12, P. M. HALL.

88/29. V. ARVATICA Jord. *Milton Brodie, near Alves, Elgin, v.-c. 95, Miss E. S. TODD. Probably this species but not quite typical; *Wiggonholt, West Sussex, v.-c. 13, E. C. WALLACE; *near Hardwick, Cambridgeshire, v.-c. 29, E. C. WALLACE.

88/30. V. DERELICTA Jord. *North Kessock, East Ross, v.-c. 106. Miss E. S. TODD; *Dornaway, near Forres, Elgin, v.-c. 95, Miss E. S. TODD.

88/31. V. LEPIDA Jord. Near Ribblehead, Mid-West Yorks, v.-c. 64, W. A. SLEDGE and P. M. HALL; *Achnacloich, Argyll, v.-c. 98, Miss MARTIN.

88/35. V. MACKAII H. C. Watson (=V. PESNEAUI Lloyd & Fouc.). Sandhills, Castletown, Caithness, v.-c. 109, Miss E. S. TODD.

92/3. DIANTHUS ARMERIA L. Hort. Hitchin. Seeds of a plant from a copse near Maidenhead, Berks, J. E. LITTLE; garden weed, Budleigh Salterton, S. Devon, v.-c. 3, H. S. REDGROVE.

93/1. D. PROLIFER L. Richborough, E. Kent, v.-c. 15, JOSHUA LAMB.

95/1. SAPONARIA OFFICINALIS L. Hamstead Marshall, v.-c. 22, J. D. GROSE.

98/3. LYCHNIS ALBA × DIOICA = INTERMEDIA (Schur). Broome, N. Wilts, J. D. GROSE.

100/2. CERASTIUM ARVENSE L. Seeds sought for many years. Seldom more than a capsule or two to be found. Hitchin, 1932, J. E. LITTLE.

100/7. C. PUMILUM Curt. Banstead Downs, Surrey, v.-c. 17, H. S. REDGROVE.

100/11. C. CERASTOIDES Britton. Grassy slopes, Beinn a' Bhuird and Cairntoul, S. Aberdeen, v.-c. 92, R. MACKECHNIE and E. C. WALLACE.

*101/4. STELLARIA NEGLECTA Weihe. Oaksey, v.-c. 7, J. D. GROSE.

101/4. S. NEGLECTA Weihe, f. GLANDULOSA Marshall in *Rep. W.B.E.C.*, 1910-11, 283. Swindon, N. Wilts, v.-c. 7, J. D. GROSE.

101/6. S. DILLENIANA Moench. South Wraxall, N. Wilts, J. D. GROSE.

102/5a. ARENARIA SERPYLLIFOLIA L., var. SCABRA Fenzl. Westover Farm, Calbourne, Isle of Wight, v.-c. 10, P. M. HALL.

102/5d. A. SERPYLLIFOLIA L., var. MACROCARPA Lloyd. Winspit, Worth Matravers, Dorset, v.-c. 9, P. M. HALL.

102/5g. A. SERPYLLIFOLIA L., var. SPHAEROCARPA Tenore. Winspit, Worth Matravers, Dorset, v.-c. 9, P. M. HALL.

102/10. A. VERNA L. Near Pateley Bridge, Yorks, v.-c. 64, alt. circa 1200 ft. (1934), K. D. LITTLE.

103/1. SAGINA NODOSA (L.) Fenzl. Near Pateley Bridge, v.-c. 64, K. D. LITTLE.

103/1b. S. NODOSA Fenzl, var. GLANDULOSA (Bess.). Priddy, v.-c. 6, J. D. GROSE.

105/2. SPERGULARIA MEDIA (Pers.) Presl. (S. MARGINATA Kitt.). Near Achnacloich, Argyll, v.-c. 98, Miss M. MARTIN.

106/1. POLYCARPON TETRAPHYLLUM L. Kingswear, S. Devon, v.-c. 3, H. S. REDGROVE.

*†108/1. CLAYTONIA ALSINOIDES Sims. Near Hindhead, S.W. Surrey, district IIIa, W. E. WARREN. (This is given for district IIIb. in the *Flora of Surrey*, p. 193. Not recorded for Surrey, v.-c. 17, in the *Comital Flora*); also Westcott Heath, Surrey, A. L. STILL.

*†108/2. C. PERFOLIATA Donn. Harlech, Mer., v.-c. 48, 1928, Mrs C. M. LLOYD, per A. E. WADE.

112/5. HYPERICUM CALYCINUM L. Menabilly, v.-c. 2, abundantly established, J. D. GROSE.

112/10. H. UNDULATUM Schousb. Now extends as far N. in Devon as Torrington, v.-c. 4, H. H. HARVEY; also by H. S. REDGROVE.

112/16. H. LINARIIFOLIUM Vahl. Near Exeter, S. Devon, v.-c. 3, H. S. REDGROVE.

115/1. ALTHAEA OFFICINALIS L. Yarmouth, v.-c. 10, J. D. GROSE.

*125/2. LINUM ANGLICUM Mill. Cornfield, Wotton, Surrey, v.-c. 17, J. G. LAWN.

127/5. Geranium phaeum L. On a dump at Eton, Bucks, v.-c. 24, R. Weatherall.

*127/11. G. rotundifolium L. Welton-le-Marsh, N. Lincoln, v.-c. 54, August 23, 1934, Lincolnshire Naturalists' Union Field Meeting, F. T. Baker.

*127/15. G. purpureum Vill. Near Newcastle Emlyn, Carmarthen, v.-c. 44, J. Chapple and T. Gambier-Parry.

†132/2. Oxalis corniculata L. Both varieties b. and c. established in garden at Falconhurst, Eden Bridge, Kent, Mr Justice Talbot; Menabilly, v.-c. 2, J. D. Grose.

†132/3. O. stricta L. Menabilly, v.-c. 2, J. D. Grose; Braunton, v.-c. 4, H. S. Redgrove.

†132/8. O. floribunda Lehm. St Catherine's Bay, Jersey, H. Phillips.

133/2. Impatiens biflora Walt. Mudeford, S. Hants, v.-c. 11, P. M. Hall, N. Douglas Simpson and W. A. Sledge; Mottisford, v.-c. 11, J. D. Grose.

133/3. I. parviflora DC. Kingston Lisle, v.-c. 22, J. D. Grose.

*133/4. I. glandulifera Royle. South Wraxall and Aldbourne, v.-c. 7, well established, J. D. Grose.

†145/4. Lupinus angustifolius L. Near Letchworth, Herts, H. Phillips.

147/2. Genista pilosa L. Kynance, v.-c. 1, J. D. Grose.

147/3b. G. tinctoria L., var. humifusa (Dicks.). Kynance, v.-c. 1, J. D. Grose.

*149/2. Ulex Gallii Planch. Speymouth, Moray, v.-c. 95, det. A. J. Wilmott, Rev. G. Birnie.

†152/9. Trigonella caerulea Ser. Portishead siding, v.-c. 6, A. L. Still.

153/1. Medicago Falcata L. Richborough, E. Kent, Joshua Lamb; Shalford Common, v.-c. 17. This plant, usually sterile, has set a few pods this year. See last *Rep.*, p. 522, A. L. Still.

†153/1b. M. Falcata L., var. tenuifoliolata Vuyck. White Hawk, Brighton, Sussex, v.-c. 14, L. A. W. Burder.

154/3. MELILOTUS ARVENSIS Wallr. St Catherine's, Guildford, Surrey, F. CLARKE.

155/5. TRIFOLIUM MOLINERII Balb. Lizard, v.-c. 1, J. D. GROSE.

155/9. T. BOCCONEI Savi. Gunwalloe, v.-c. 1, J. D. GROSE.

155/10. T. SCABRUM L. Lizard, v.-c. 1, J. D. GROSE.

155/11. T. STRIATUM L. Oxted, distr. ix, Surrey, W. H. WILDING; Lizard, v.-c. 1, J. D. GROSE.

155/12. T. SUBTERRANEUM L. Mullion, v.-c. 1, J. D. GROSE.

*155/15. T. HYBRIDUM L. Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

*156/2. ANTHYLLIS COCCINEA L. Darrynane, Co. Kerry. New to Ireland, det. Dr SCHINZ, J. CHAPPLE and T. GAMBIER PARRY.

160/4b. LOTUS ULIGINOSUS Schkuhr, var. GLABER Bréb. Gunwalloe, v.-c. 1, J. D. GROSE.

*†170/1. CORONILLA VARIA L. Merrow Common, near Guildford, v.-c. 17, J. G. LAWN.

*176/1. VICIA SYLVATICA L. Near Fairoak Lane, Chessington, Surrey, 30th September 1934. New record for v.-c. 17, M. L. WEDGWOOD.

†176/2. V. TENUIFOLIA Roth. Introduced into garden with Arbor-vitae, 20 The Avenue, Hitchen, Herts, July 1934. The pod has a stipe of 2.0 mm. Leaflets very acute, J. E. LITTLE.

176/3. V. CRACCA L., var. ARGENTEA Coss. & Germ. (*incana* Thuill.). Oxmoor Lane, Sowerby, Thirsk, in quantity, July 10, 1934, T. J. FOGGITT.

†176/5. V. VILLOSA Roth. Portishead Dock, v.-c. 6, A. L. STILL.

176/7. V. BITHYNICA L. Richborough, E. Kent, JOSHUA LAMB; *on waste ground in Norwich, v.-c. 27, 25th May 1934, E. A. ELLIS.

176/9. V. LUTEA L. Richborough, E. Kent, JOSHUA LAMB.

*†178/1. LATHYRUS LATIFOLIUS L. Blunsdon, v.-c. 7, well established, J. D. GROSE.

178/3. L. TUBEROSUS L. Portishead Dock, v.-c. 6, A. L. STILL.

178/8. L. NISSOLIA L. Richborough, E. Kent, JOSHUA LAMB.

178/9. L. APHACA L. Portishead siding, v.-c. 6, A. L. STILL.

178/25. L. montana Bernh. Savernacke Forest, near Marlborough, N. Wilts, v.-c. 7, Miss L. Abell.

183/3. Prunus avium L. In copses near Forestside, W. Sussex, v.-c. 13. Not, of course, a N.C.R. but an addition to the *Comital Flora*, which following *Top. Bot.* and its *Supplements* omits v.-c. 13 for this species. It was recorded in Arnold's *Flora of Sussex*. Mr Wallace's record of *O. maculata* L. (*O. ericetorum* Linton) in last year's *Report* was an exactly parallel case.

†183/6e. P. insititia L., var. latifolia (Jord. & Fourr.). Torrington, N. Devon, v.-c. 4. It is known locally as " French ails " (some corruption of Fr. *alisier*?), H. H. Harvey.

189/4. Potentilla argentea L. Headley, N. Hants, v.-c. 12, P. M. Hall.

†189/11. P. norvegica L. Portishead Dock, v.-c. 6, A. L. Still; near Leyland, v.-c. 59, H. E. Bunker.

190/1. Alchemilla hybrida Mill. (*A. pubescens* Lam.). Grassy ground near Aviemore, Inverness, v.c. 96, Miss E. S. Todd.

190/4. A. minor Huds. Loch an Eilean, Aviemore, Inverness, v.-c. 96, Miss E. S. Todd.

190/8. A. alpestris Schmidt. Kincraig Bridge, Inverness, v.-c. 96, Miss E. S. Todd; near Wynch Bridge, v.-c. 65, H. S. Redgrove.

191/2. Agrimonia odorata (Gouan) Mill. Coxmoor Wood, Crondall, N. Hants, v.-c. 12, Lt.-Col. G. Watts; Bennan Head, Arran, v.-c. 100, R. Mackechnie.

193/4. Poterium officinale (L.) A. Gray. (*Sanguisorba officinalis* L.). Coryton, N. Devon, v.-c. 4, H. H. Harvey.

*195/10. Sorbus porrigens Hedlung. Garryland, Gort, Co. Clare, v.-c. H.9, H. W. Pugsley, *Journ. Bot.*, lxxii, 58 (February 1934).

195/13. Pyrus Aria (L.) Ehrh. Jervaulx Park, N. Riding, Yorks, v.-c. 65 (1933), (? planted). Det. F. J. Chittenden, K. D. Little; Hazlehead Woods, S. Aberdeen, v.-c. 92, Mrs Macalister Hall.

195/13c. P. Aria (L.) Ehrh., var. incisa Reichb. Wroughton, v.-c. 7, J. D. Grose.

195/15. P. torminalis (L.) Ehrh. Lane near Shilley Green, Herts. The only wild tree known to me in the Ivel District. In 1918 it was a tree 15 ft. high; now cut down with hedge, but shooting again, 1934, J. E. Little.

†197/2. Cotoneaster microphyllus Wallich. Cliffs E. of Dover, some very old bushes, v.-c. 15, R. A. F. Brenan.

†197/3. C. Simonsii Baker. Fleet, N. Hants, v.-c. 12, Lt.-Col G. Watts.

199/15. Saxifraga cespitosa L. Not rare on Beinn a' Bhuird, but mostly inaccessible. S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

199/19. S. rivularis L. Cairn Toul, alt. 4000 ft., S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

*199/24. S. umbrosa L. Quite wild in Ridgewood, Meopham Parish, S.W. of Rochester, W. Kent, v.-c. 16, C. M. Baker.

203/1. Chrysosplenium alternifolium L. Tockenham, Wilts. Not recorded for this section of v.-c. 7 in *Fl. Wilts.*, J. D. Grose.

210/1. Cotyledon Umbilicus-Veneris L. Headley, N. Hants, v.-c. 12, see note in Distributor's Report, P. M. Hall.

*211/4. Sedum Forsterianum Sm. Cheddar, N. Somerset, J. D. Grose.

211/22. S. roseum Scop. ♀ plant. Isle of Skye, 1933, Mrs E. T. Mustard.

213/2. Drosera longifolia L. Linwood, v.-c. 11, J. D. Grose.

213/2b. D. longifolia L., var. caulescens Hind. Pond on Stoborough Heath, Wareham, Dorset, P. M. Hall.

*217/2. Callitriche obtusangula Le Gall. Pond near Sandhead, Wigtown, v.-c. 74; ditches at Loch Shiel, Inverness, v.-c. 97, G. Taylor.

*217/3. C. verna L., em. Lönnr. Hillside between Middleton and St John's Chapel, v.-c. 66, G. Taylor.

217/5. C. intermedia Hoffm. Loch Kandor, Glen Callater, S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

217/5d. C. intermedia Hoffm., var. homoiophylla G. & G. Loch Callater, S. Aberdeen, v.-c. 92, E. C. Wallace.

220/13. Epilobium anagallidifolium Lam. Greenhow, W. Riding, Yorks, alt. circ. 1200 ft., K. D. Little.

†220/15. E. nummularifolium R. Cunn. Garden weed, Rhiwbina, Glamorgan, v.-c. 41, 1931, H. A. Hyde, seeding freely; roadside near

Pen-y-gwryd Hotel, Nantgwynant, Caern., v.-c. 49, 1934, Mrs C. M. Le Lacheur; comm. A. E. Wade.

223/1c. Oenothera biennis L., var. parviflora (L.) Dr. Nantgarrw, Glamorgan, H. Phillips.

223/3. O. odorata Jacq. In abundance on the sandhills in one area E. of Sandwich, v.-c. 15, J. P. M. Brenan; *Bel Royal and St Ouen's Bay, Jersey, H. Phillips.

†234/1. Carpobrotus edulis (L.) N.E.Br. Bel Royal, Jersey, H. Phillips.

*239/1. Eryngium campestre L. In a pasture field near the railway line at Hermitage, Berks, v.-c. 22, confirmed W.H.P., Miss A. M. Neild.

†240/1. Astrantia major L. By Castle Semple Loch, Renfrew, v.-c. 70, R. Mackechnie.

244/1. Smyrnium Olusatrum L. Near Folkestone, E. Kent, v.-c. 15, Viscountess Gladstone.

245/5. Bupleurum tenuissimum L. Gunnard Bay, v.-c. 10, J. D. Grose.

†245/6. B. lancifolium Hornem. Spontaneous garden weed at Tonbridge, v.-c. 16, J. P. M. Brenan; Gerard's Cross, Bucks, Mrs Pemberton Pigott.

†245/12. B. petraeum L. Alien, Europe. Waste heap, Hitchin, Herts, H. Phillips.

247/1. Apium graveolens L. Between Worth and Sandwich, v.-c. 15, Miss C. F. Cloke.

250/2. Carum verticillatum Koch. Abundant at Langtree and Shebbear, N. Devon, v.-c. 4, H. H. Harvey.

250/4. C. segetum B. & H. In great abundance near High Down, Pirton, Herts; sea banks, Sutton-on-Sea, Lincs, A. Lindsell.

*263/1. Foeniculum vulgare Mill. Norton Spit, v.-c. 10, J. D. Grose.

264/1. Crithmum maritimum L. Beach shingle, Kessingland, East Suffolk, v.-c. 25, four plants, 1933, E. A. Ellis.

265/3. Oenanthe crocata L. Near Achnacloich, Argyll, v.-c. 98, Miss M. Martin.

265/6. O. Lachenalii C. Gmel. Oughton Head, Hitchin, Herts, 1934, Joshua Lamb. Carrying on previous records, but the plant is vanishing, J. E. Little.

*271/1. Ligusticum scoticum L. Near Connel, Argyll, v.-c. 98, Miss M. Martin.

†277/1. Heracleum Mantegazzianum S. & L. Tockenham, v.-c. 7, naturalised, J. D. Grose.

†283/2. Caucalis daucoides L. Casual at Lockerley Mill, S. Hants, v.-c. 11, Miss B. Gullick.

283/5. C. nodosa Scop., b. pedunculata (R. & F.) Dr. Cardiff, Glamorgan, v.-c. 41, E. Vachell.

†283/8. C. latifolia L. Casual at Lockerley Mill, S. Hants, v.-c. 11, Miss B. Gullick.

287/3. Sambucus Ebulus L. Sevenhampton, v.-c. 7, J. D. Grose.

306/2. Dipsacus pilosus L. Hodson, v.-c. 7, J. D. Grose.

312/2. Solidago Virgaurea L. A form or var. near to var. *cambrica* (Huds.). Near Wynch Bridge, Teesdale, v.-c. 65, H. S. Redgrove.

†312/3. S. lanceolata L. On both sides of a road dividing the parishes of Tawstock and Fremington, N. Devon, v.-c. 4, in some quantity, R. Taylor.

318/19b. Aster Tripolium L., var. discoideus Reichb. Newtown, v.-c. 10, J. D. Grose.

318/20. A. Linosyris Bernh. Near Berry Head, S. Devon, v.-c. 3, H. S. Redgrove.

320/2. Erigeron acer L., var. pseudo-elongata (Rouy). Banks of R. Medway, Aylesford, W. Kent, R. B. Ullman.

†320/3. E. canadensis L. Near Lingfield, distr. ix, Surrey, W. H. Wilding.

nd [illegible]

324/4. Filago gallica L. Shalford Common, Surrey, J. G. Lawn.

†324/6. F. arvensis L. Laughton, Lincs, v.-c. 54, Dr H. B. Willoughby Smith.

328/5b. Gnaphalium supinum L., var. fuscum Hartm. Tolmount, S. Aberdeen, v.-c. 92, E. C. Wallace.

333/1. Inula Helenium L. Bank of River Yare, Brundall, East Norfolk, v.-c. 27, E. A. Ellis.

333/5. I. CRITHMOIDES L. Damp spot beneath the cliffs between Dover and Folkestone, v.-c. 15, Dr A. R. M. BRENAN; Newtown, I. of Wight, v.-c. 10, J. D. GROSE.

334/2. PULICARIA VULGARIS Gaertn. Woodstreet, 3 miles W. of Guildford, Surrey, W. E. WARREN.

†339/4. AMBROSIA TRIFIDA L. Casual near chicken-run, Glynde, E. Sussex, v.-c. 14, Miss K. PICKARD.

†339/4b. A. TRIFIDA L., var. INTEGRIFOLIA (Willd.) Torr. & Gray. Differs from the more frequent *A. artemisiifolia* L. by having its upper leaves (or all of them) undivided, ovate or oval. Waste ground, Burton-on-Trent, R. C. L. BURGES; garden ground, Ickleford, Herts (1934), J. E. LITTLE.

†341/3. XANTHIUM SPINOSUM L. In two places between Sandwich and Worth, v.-c. 15, Miss C. F. CLOKE.

†354/1. GALINSOGA PARVIFLORA Car. Well established by the roadside between Cranbrook and Goudhurst, E. Kent, v.-c. 15, Dr LANGMEAD; waste ground, Fleet, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†356/1. HEMIZONIA PUNGENS Torrey & Gray. Waste ground, Burton-on-Trent, R. C. L. BURGES.

378/2. ARTEMISIA CAMPESTRIS L. Near Holt, E. Norfolk, v.-c. 27, Miss GARNER-RICHARDS.

378/3. A. VULGARIS L., var. MAJOR Rouy. Field edge at Hadleigh, W. Suffolk, v.-c. 26, det. W. H. PEARSALL, R. BROWN.

380/1. PETASITES OFFICINALIS Moench. (*P. ovatus* Hill). Only male-functioning flowers, producing no seeds, at Stalham, Brampton, Oxnead, Costessey, Keswick, Cantley and Earsham, East Norfolk, v.-c. 27, E. A. ELLIS.

†381/1. DORONICUM PARDALIANCHES L. Ayot St Peter, Herts, 1934, J. E. LITTLE.

*†383/7. SENECIO SQUALIDUS L. Railway embankment near Taunton, S. Somerset, v.-c. 5, W. WATSON, *Journ. Bot.*, lxxii, 351 (December 1934).

*†383/8. S. VISCOSUS L. Railway embankment near Taunton, S. Somerset, v.-c. 5, W. WATSON, *Journ. Bot.*, lxxii, 351 (December 1934); new by-pass road W. of Guildford, Surrey, W. E. WARREN.

†383/31. S. CINERARIA DC. Cliffs E. of Dover, v.-c. 15, R. A. F. BRENAN.

396/2. CIRSIUM LANCEOLATUM Scop. Waste heap, Welwyn, Herts, H. PHILLIPS.

396/8e. C. SETOSUM M.B. Pitmilly, Fife, v.-c. 85, M. S. CAMPBELL.

397/1b. ONOPORDON ACANTHIUM L., var. VIRIDE Michet. Watchfield, v.-c. 22, J. D. GROSE.

405/2. CENTAUREA JUNGENS Gugl. St Ouen's Bay, Jersey, H. PHILLIPS.

405/3. C. ANGUSTIFOLIA Gugl. Don Bridge, Jersey, H. PHILLIPS.

405/7. C. PRATENSIS Thuill. Grave de Lecq and St Ouen's, Jersey, H. PHILLIPS.

405/8. C. OBSCURA Jord. Langtree, N. Devon, v.-c. 4, H. H. HARVEY.

*405/9. C. DRUCEI C.E.B., f. SUBTERNUDA. Hitchin, Herts, H. PHILLIPS.

405/11. C. NEMORALIS Jord. Railway-bank, Llanishen, Glamorgan, H. PHILLIPS.

405/11b. C. NEMORALIS Jord., var. DIVERSIFOLIA C.E.B., f. RADIATA. Near Cowbridge, Glamorgan, H. PHILLIPS.

405/12. C. CYANUS L. In great abundance, tingeing a cornfield. Bedwell Plash, Stevenage, Herts, 1934, A. BYGRAVE.

†405/25. C. DIFFUSA Lam. Splott, Cardiff, Glamorgan, v.-c. 41, 1933, Miss E. VACHELL, comm. A. E. WADE.

†405/31. C. SOLSTITIALIS L. Upper Axford, v.-c. 7, J. D. GROSE.

†407/1. CARTHAMUS LANATUS L. Chicken-run, Barcombe Mills railway station, E. Sussex, v.-c. 14, Miss K. PICKARD and W. H. PEARSALL.

416/10. CREPIS TARAXACIFOLIA Thuill. Near Fort Regent, Jersey, H. PHILLIPS.

419/56. HIERACIUM LEYI F.J.H. Near Wynch Bridge, Teesdale, v.-c. 65, H. S. REDGROVE.

419/83. H. PELLUCIDUM Laest. High Force, Teesdale, v.-c. 66, H. S. REDGROVE.

419/207. H. TRIDENTATUM Fr. Byfleet, Surrey, v.-c. 17, H. S. REDGROVE.

419/218. H. TRICHOCAULON D. Near Frensham, N. Hants, v.-c. 12, P. M. HALL [det. H. W. PUGSLEY as *H. rigidum*, var. *trichocaulon*].

419/223. H. SCABRESCENS D. Boarhunt, S. Hants, v.-c. 11, P. M. HALL [det. H. W. PUGSLEY as *H. rigidum*, var. *scabrescens*].

422/3. LEONTODON HIRTUS L. (*Thrincia hirta* Roth). Cheadle Hulme, Cheshire, v.-c. 58, J. W. HARTLEY.

425/1. LACTUCA VIROSA L. Former dump of London rubbish, Gault Pit, Shefford, Beds, F. RANSOM and J. E. LITTLE.

425/3. L. SALIGNA L. Near Earith Bridge, Cambs, v.-c. 29, E. C. WALLACE.

425/6. L. ALPINA Hook. With reference to the record of this in last year's *Report*, p. 532, we have now heard from Mr G. W. Temperley that the Swiss form of this species is in cultivation in a garden about ¾ mile from Lake Ullswater on the western shore opposite the middle reach. No doubt the seeds were wind-blown from there to the locality given in *Report*, 1933.

427/4f. SONCHUS OLERACEUS L., var. CILIATUS (Lam.) Dr. Letchworth, Herts, H. PHILLIPS.

†428/1. TRAGOPOGON PORRIFOLIUS L. Waste place near Ramsgate Station, v.-c. 15, A. R. M. BRENAN.

434/1. PHYTEUMA ORBICULARE L. Avebury, v.-c. 7, J. D. GROSE.

435/3. CAMPANULA TRACHELIUM L. Near High Down, Pirton, Herts, 1934, a diminishing species, JOSHUA LAMB.

439/1. OXYCOCCUS QUADRIPETALA Gilib. Beside Loch Phadruig, alt. 2200 ft., S. Aberdeen, v.-c. 92, R. MACKECHNIE and E. C. WALLACE.

446/7b. ERICA VAGANS L., var. KEVERNENSIS Turrill. Coverack, v.-c. 1, J. D. GROSE.

456/1. MONOTROPA HYPOPITYS L. Pegsdon, Beds, 1934, A. LONG.

457/1. LIMONIUM VULGARE Mill. Has recently colonised the south shore of Breydon, after its recorded absence from the estuary for 150 years, v.-c. 25, E. A. ELLIS.

457/2. L. HUMILE Mill. Newtown, I. of Wight, v.-c. 10, J. D. GROSE.

459/1. HOTTONIA PALUSTRIS L. Oxford, v.-c. 23, J. D. GROSE.

460/1. PRIMULA ELATIOR Jacq. Polton, Beds, on boulder clay, 1934, H. and D. MEYER. This confirms its occurrence in Beds for which it was rejected by Miller Christy and Jas. Saunders, J. E. LITTLE.

460/1. P. ELATIOR × VULGARIS Huds. Polton, Beds (1934), with the above (!J. E. Little), H. and D. MEYER.

460/3. P. VERIS × VULGARIS Huds. Hatley Cockayne, Beds, 1932, J. E. LITTLE and M. BROWN.

463/1. LYSIMACHIA THYRSIFLORA L. South Wraxall, v.-e. 7. The Rev. T. A. Preston in *The Flowering Plants of Wilts*, 1888, states: " There is reason to believe that this plant has been introduced in the above station, probably by the late Mr William Sole, of Bath.'' The plant is now, 1934, fairly plentiful, J. D. GROSE.

*463/2. L. VULGARIS L. Connel, Argyll, v.-c. 98, Miss M. MARTIN.

467/3. ANAGALLIS CAERULEA Schreb. Hort. Stevenage, Herts, July 1934. Leg. Rev. C. P. H. REYNOLDS. Has appeared for several years with *A. phoenicea* Lamk. Comm. J. E. LITTLE.

476/1. MICROCALA FILIFORMIS H. & L. Ruan Lanihorne, v.-c. 2, J. D. GROSE; Ridge, Dorset, v.-c. 9, H. S. REDGROVE.

478/1. CENTAURIUM UMBELLATUM Gilib., var. CAPITATUM (Koch) Dr. Grosnez Castle, Jersey, H. PHILLIPS.

478/4. C. PULCHELLUM Dr., f. SCHWARTZIANA Wittr. Ridge, Dorset, v.-c. 9, H. S. REDGROVE.

480/1. GENTIANA PNEUMONANTHE L. Hartland Moor, Dorset, v.-c. 9, H. S. REDGROVE.

480/6b. G. LINGULATA Ag., var. PRAECOX Towns. Cheesefoot Head, near Winchester, S. Hants, v.-c. 11; new to this district of Hampshire and in very small quantity, P. M. HALL and H. W. PUGSLEY.

*480/8. G. GERMANICA Willd. On turfy rocky ground on the shores of Loch Keilisport, near Kilberry, v.-c. 101, Mrs MACALISTER HALL. This is the first record for Scotland for this species, which hitherto has not been known farther north than Flint and Derbyshire.

*482/1. LIMNANTHEMUM NYMPHAEOIDES Hoffm. & Link. River Yare, Keswick, East Norfolk, v.-c. 27, E. A. ELLIS.

†490/2. OMPHALODES VERNA Moench. Dolton, N. Devon, v.-c. 4, Rev. R. HOLMES; Great Barton, Suffolk, v.-c. 26, obviously originally planted but now quite established, H. S. REDGROVE.

491/1. CYNOGLOSSUM OFFICINALE L. Radwell, Beds, Mrs HAYES.

†493/2. Lappula echinata Gilib. In the dry bed of the R. Mole between Leatherhead and Mickleham, Surrey, P. H. Cooke.

501/1. Lycopsis arvensis L. Near Oxted, distr. ix, Surrey, W. H. Wilding.

506/4. Myosotis caespitosa K. F. Schultz. Fleet Pond, N. Hants, v.-c. 12, P. M. Hall.

506/6. M. alpestris Schmidt. Rocks at head of Caenlochan Glen, Angus, v.-c. 90. Seen again after many years by R. Mackechnie and E. C. Wallace.

506/7. M. sylvatica (Ehrh.) Hoffm. Woodland near Vernham's Dean and at Hampshire Gate, near Andover, N. Hants, v.-c. 12; the former station at least undoubtedly native and not far from the well-known Berkshire locality at Riever Wood, P. M. Hall; *in a wood near Henley, Oxon., v.-c. 23, and appearing truly native, N. Y. Sandwith and E. Milne-Redhead.

*515/3. Cuscuta epithymum (L.) Murr. By Lady's Island Lake, Rosslare, Co. Wexford, J. Chapple and T. Gambier-Parry.

515/4. C. trifolii Bab. Near East Clandon, Surrey, v.-c. 17. Not given for this division (iv) in *Fl. Surrey*, p. 472, Lady Davy.

†518/7. Physalis peruviana L. Waste ground, Burton-on-Trent, R. C. L. Burges.

524/1. Hyoscyamus niger L. Hamstead Marshall and Watchfield, v.-c. 22, over 100 plants in this locality, J. D. Grose.

†524/2. H. albus L. Dormant seeds brought to surface by road widening, or recently introduced? Pirton Road, Hitchin, Herts, 1934, det. J. E. Little, Joshua Lamb.

†527/1. Verbascum Phlomoides L. Waste heap, Welwyn, Herts, H. Phillips.

527/5. V. Blattaria L. Wood in N. Lincs, v.-c. 54, det. W.H.P., F. T. Baker.

*†527/6. V. pulverulentum Vill. Railway embankment, near Taunton, S. Somerset, v.-c. 5, W. Watson. *Journ. Bot.*, lxxii, 351 (December 1934); *railway embankment, near Colchester, N. Essex, v.-c. 19, A. W. Graveson, comm. J. E. Lousley, *loc. cit.*, 173 (June 1934).

†532/2. Linaria purpurea Mill. Norton Spit, v.-c. 10. Stated in *Rep. B.E.C.*, 1931, 749, to be gone from this locality, but there are still (1934) several plants there, J. D. Grose.

532/3. L. repens (L.) Mill. On the downs near Streatley-on-Thames, Berks, Dorothy A. Cadbury; well established by a roadside near Sutton Park, Birmingham, R. C. L. Burges; and in abundance on a disused railway line near *Upper Stonar, Sandwich, v.-c. 15, J. P. M. Brenan.

532/4. L. Pelisseriana Mill. Adventive on newly-made ground, near Birmingham, v.-c. 38, R. C. L. Burges.

*532/5. L. supina Desf. Tower Hill Station, N. Devon, v.-c. 4, Rev. H. N. Smith Pearse.

532/24. L. spuria (L.) Mill. Oxted, distr. ix, Surrey, W. H. Wilding.

539/1. Limosella aquatica L. Breamore Common, S. Hants, v.-c. 11, Miss Gullick and P. M. Hall.

540/1. Sibthorpia europaea L. Mullion, v.-c. 1, J. D. Grose; Torrington, v.-c. 4, H. S. Redgrove.

†542/1. Erinus alpinus L. Near Hawes, N.W. Yorks, v.-c. 65, Miss Oxlee.

543/6b. Veronica scutellata L., var. villosa Schum. Fen at Hockham Mere, West Norfolk, v.-c. 28, E. A. Ellis.

543/9b. V. aquatica Benquerel, var. anagalliformis (Boreau). Winchfield, N. Hants, v.-c. 12, Lt.-Col. G. Watts.

543/14. V. verna L. Near Mildenhall, Suffolk, v.-c. 26, H. S. Redgrove.

543/19. V. agrestis L. Lamlash, Arran, v.-c. 100, R. Mackechnie.

545/3. Euphrasia brevipila Burn. & Gr. Chapel Brae, Halcro, S. Ronaldsay, Orkney, v.-c. 111 (Ref. 4918 and 4995), H. H. Johnston; Woodford, Galway, v.-c. 15; Windy Gap and Waterville, Co. Kerry, J. Chapple and T. Gambier-Parry.

545/3. E. brevipila × nemorosa, var. collina Pugsl. Gentian Hill, Galway, v.-c. 16, J. Chapple and T. Gambier-Parry.

545/3. E. brevipila B. & G., var. notata Pugsl. Near Cruden Bay, N. Aberdeen, v.-c. 93, Mrs Macalister Hall.

*545/5. E. nemorosa Löhr. Banks of River Ythan, N. Aberdeen, v.-c. 93, Mrs Macalister Hall.

545/5. E. nemorosa Löhr., var. collina Pugsl. Langdon Common, Durham, H. Phillips; Darrynane, Co. Kerry, v.-c. 1; Gentian Hill, Galway, v.-c. 16; Rosslare, Co. Wexford, v.-c. 12; Glen Cahir, Co. Clare, v.-c. 9, J. Chapple and T. Gambier-Parry.

545/10. E. occidentalis Wettst. (Det. H. W. Pugsley). Winspit, Worth Matravers, Dorset, v.-c. 9, P. M. Hall.

545/13. E. foulaensis Towns. Chapel Brae, Halcro, S. Ronaldshay, Orkney, v.-c. 111 (Ref. 4916 and 4994), H. H. Johnston.

545/16. E. scotica Wettst. Ben Laoigh, Argyll, v.-c. 98, Mrs Macalister Hall.

545/18. E. confusa Pugsl., f. albida Pugsl. Fitty Hill, Westray, Orkney, v.-c. 111 (Ref. 4949), H. H. Johnston; *Kenfig Pool, Glamorgan, J. Chapple.

545/18. E. confusa Pugsl., f. grandiflora Pugsl. North-east side of Ward Hill, Hoy, Orkney, v.-c. 111 (Ref. 4989), H. H. Johnston.

545/18×. E. confusa Pugsl. × foulaensis Towns. About 100 yards N. of Halcro Farm Steading, S. Ronaldshay, Orkney, v.-c. 111 (Ref. 4919 and 4996), H. H. Johnston.

545/19(4). E. anglica Pugsl. Matley, S. Hants, v.-c. 11, P. M. Hall and W. A. Sledge.

545/21(2). E. Pseudo-Kerneri Pugsl. Edge of Cheriton Wood, near Bramdean, N. Hants, P. M. Hall; Apesdown, I. of Wight, v.-c. 10, J. D. Grose.

546/1. Bartsia alpina L. Widdybank Fell, Teesdale, v.-c. 66, H. S. Redgrove.

546/4. B. viscosa L. Fairwood Common, Gower, Glam., v.-c. 41, A. L. Still; Ridge, Dorset, v.-c. 9, and Braunton Burrows, N. Devon, v.-c. 4, H. S. Redgrove.

*549/2. Melampyrum arvense L. In wheat, on loam with clay subsoil, Newton Blossomville, Bucks, v.-c. 24, det. J. E. Little, A. W. Previte.

550/3. Orobanche rubra Sm. *Near Winchester, v.-c. 11, Rt. Hon. H. T. Baker; Kynance, Cornwall, v.-c. 1, J. D. Grose.

550/7. O. Hederae Duby. Ventnor, v.-c. 10, J. D. Grose.

550/10. O. minor Sm. Near Winchester, S. Hants, v.-c. 11, Hon. G. Charteris; Portslade, W. Sussex, v.-c. 13, Miss L. Abell.

550/12. O. purpurea Jacq. Trimingham cliff, East Norfolk, v.-c. 27, five plants on *Achillea Millefolium*, July 12th, 1934, E. A. Ellis.

552/4. UTRICULARIA OCHROLEUCA Hartm. Loch Callater, S. Aberdeen, v.-c. 92, R. MACKECHNIE and E. C. WALLACE; Hartland Moor, Dorset, H. S. REDGROVE; *in Kerry, v.-c. H.2, R. W. SCULLY, *Journ. Bot.*, lxxii, 209 (July 1934). The note also refers to a previous record for W. Donegal, v.-c. H.35 (*Journ. Bot.*, 1912, 287), which is omitted in *Comital Flora.*

553/2. PINGUICULA VULGARIS L. Cothill, v.-c. 22, J. D. GROSE.

553/4. P. LUSITANICA L. Kennack, v.-c. 1, J. D. GROSE; Bridestowe, v.-c. 4, H. H. HARVEY.

558/1. MENTHA ROTUNDIFOLIA Huds. Waste ground, Weybridge, Surrey, J. G. LAWN; Llangennith, Gower, v.-c. 41, A. L. STILL.

558/1×. ×M. SPICATA = CORDIFOLIA (Opiz) Fraser. Blackbrook, Dorking, v.-c. 17; Rushett Green, Grafham, v.-c. 17, with purple flowers, A. L. STILL.

558/2. M. ALOPECUROIDES Hull. Hurst Green and Rushett Green, Grafham, v.-c. 17, A. L. STILL.

558/3g. M. LONGIFOLIA Huds., var. PULVERULENTA (Strail). R. Darenth, near Farningham, W. Kent, v.-c. 16. Still flourishing in this locality where it was recorded by Rev. E. S. MARSHALL in 1894, A. L. STILL.

558/3×. ×M. SPICATA = VILLOSO-NERVATA (Opiz) Fraser. Near Reigate Heath, v.-c. 17, det. J. FRASER, A. L. STILL.

558/4. M. SPICATA Huds. In a derelict cottage garden, near Bramdean, N. Hants, v.-c. 12, Lt.-Col. G. WATTS; Llangennith, Llanrhidian (sparingly), Burry Green and Blackhills, in Gower, v.-c. 41, A. L. STILL; *Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

558/6d. M. PIPERITA L., var. SUBCORDATA Fraser. Llangennith and Llanrhidian, Gower, v.-c. 41, A. L. STILL.

558/7f. M. AQUATICA L., var. INCISO-SERRATA Briq. Gwernfrwyd, Gower, v.-c. 41, W. R. SHERRIN.

558/9. M. VERTICILLATA L. Llangennith, Gower, v.-c. 41. Mr Fraser says this is the same as the type in the Linnean Herb. It is a slender, much branched plant, full of flowers and resembles plants in the Druce collection labelled var. ELATA, A. L. STILL.

558/9e. M. VERTICILLATA L., var. BENESCHIANA Opiz. Dunsfold Green, Surrey, v.-c. 17, det. J. FRASER, A. L. STILL.

558/9f. ×M. VERTICILLATA (L.), var. ADULTERINA Briq. Aberthin, Glamorgan, H. PHILLIPS.

558/9p. M. VERTICILLATA L., var. TRICHODES Briq. Park Mill and Bishopston Valley, Gower, v.-c. 41. Identified by comparison with Druce's sheet from Hereford, so named by Briquet (*Rep. B.E.C.*, 1924), A. L. STILL.

558/9q. ×M. VERTICILLATA (L.), var. RIVALIS Briq. Langdon Beck, Durham, H. PHILLIPS.

558/10. M. GENTILIS L. Blashford, S. Hants, v.-c. 11, P. M. HALL and E. C. WALLACE; *in a derelict cottage garden, near Bramdean, N. Hants, v.-c. 12, Lt.-Col. G. WATTS; Llangennith and Bishopston Valley, Gower, v.-c. 41, A. L. STILL; Brixham, S. Devon, v.-c. 3, F. M. DAY; *Lamlash, Arran, v.-c. 100, R. MACKECHNIE.

*558/11. M. CARDIACA Baker. Llangennith, Glamorgan, v.-c. 41, A. L. STILL.

558/12. M. RUBRA Sm. Llangennith, Overton and Park Mill, Gower, v.-c. 41, A. L. STILL; Colwall, Hereford, v.-c. 36, F. M. DAY; Greywell, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

558/12d. M. RUBRA Huds., var. RARIPILA Briq. Near Crookham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS (det. J. FRASER and A. L. STILL).

558/13j. M. ARVENSIS L., var. DENSIFOLIATA Briq. Dunsfold, Surrey, v.-c. 17, det. J. FRASER, A. L. STILL.

558/14. M. PULEGIUM L. Breamore Common, S. Hants, v.-c. 11, Miss GULLICK and P. M. HALL.

562/4. CALAMINTHA SYLVATICA Bromf. Apesdown, v.-c. 10, J. D. GROSE.

562/6. C. VILLOSA Boiss. Corfe Castle, Dorset, H. S. REDGROVE.

562/8. C. ACINOS Clairv. Souston Quarry, N. Devon, v.-c. 4, H. H. HARVEY.

†566/13. SALVIA NEMOROSA L. Portishead Docks, v.-c. 6, det. Herb. Mus. Brit., A. L. STILL.

†566/17. S. VERTICILLATA L. Portishead Docks, v.-c. 6, A. L. STILL.

569/1. NEPETA CATARIA L. Watchfield, v.-c. 22, J. D. GROSE.

569/1b. N. CATARIA, var. SUBINCISA Asch. Ashbury, v.-c. 22, J. D. GROSE.

572/1. SCUTELLARIA GALERICULATA L., var. PUBESCENS Benth. Near Achnacloich, Argyll, v.-c. 98, Miss M. MARTIN.

572/2. S. MINOR Huds. Buxton Heath, Hevingham, East Norfolk, v.-c. 27, E. A. ELLIS.

*573/2 PRUNELLA LACINIATA L. One plant growing in a cart track in Mill Field, Boxted Hall Farm, North Essex, v.-c. 19. First noticed, 20th July 1933; flowering again, 22nd July 1934, Miss G. M. R. HEELEY.

574/1. MELITTIS MELISSOPHYLLUM L. Coverack, W. Cornwall, v.-c. 1, J. D. GROSE; Kelly, v.-c. 3, and Bradstone, v.-c. 4, H. H. HARVEY.

576/1. MARRUBIUM VULGARE L. Old Swindon, v.-c. 7. Waste ground. Stated in *Wilts Flora* to be no recent record for the county, J. D. GROSE.

578/4. GALEOPSIS LADANUM L. (agg.). Oxted, distr. ix, Surrey, W. H. WILDING.

578/4c. G. ANGUSTIFOLIA Ehrh. Pirton, Herts. Many of the plants are small-flowered. They vary much as to the glandular hairs on the calyx, K. D. LITTLE.

†579/1. LEONURUS CARDIACA L. Northcott hamlet, N. Devon, v.-c. 4, H. H. HARVEY.

581/3. LAMIUM PURPUREUM L., f. ALBUM. Ainderby, near Northallerton, Yorks, v.-c. 65, Miss C. M. ROB. Growing in masses with the ordinary red-flowered type from which it differs in its pure white flowers without any spots or markings, and the uppermost leaves pale green, as are also the calyx-teeth.

581/4. L. HYBRIDUM Vill. Winchfield, N. Hants, v.-c. 12, Lt.-Col. G. WATTS; Rhossili, Glamorgan, v.-c. 41, E. C. WALLACE.

587/4. AJUGA CHAMAEPITYS (L.) Schreb. Between Alresford and Bramdean, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

†588/1. PLANTAGO INDICA L. Alresford, N. Essex, v.-c. 19. One plant in a field of roots, M. S. CAMPBELL; (as *P. ramosa* Asch.) shown to me by Mr L. B. Hall at Parkstone, Dorset, v.-c. 9, H. S. REDGROVE.

593/2. HERNIARIA CILIATA Bab. Kynance, v.-c. 1, J. D. GROSE.

†596/6. AMARANTHUS RETROFLEXUS L. On a rubbish heap at Cliffe, W. Kent, v.-c. 16, M. S. CAMPBELL.

600/1. CHENOPODIUM RUBRUM L. Breamore Common, S. Hants, v.-c. 11, Miss GULLICK and P. M. HALL; waste field, Weybridge, Surrey, J. G. LAWN.

600/4. C. HYBRIDUM L. Rubbish heap on right bank of the Medway, near Aylesford, v.-c. 15, J. P. M. BRENAN; gardens in Salisbury, v.-c. 8, Miss B. GULLICK; waste ground, Wotton, Surrey, J. G. LAWN.

600/5. C. URBICUM L. Langney Point, Eastbourne, Sussex, J. G. LAWN.

600/7. C. OPULIFOLIUM Schrad. Waste ground, Wotton, Surrey, J. G. LAWN.

600/12. C. FICIFOLIUM Sm. Brickfield, Albury, Surrey, J. G. LAWN.

600/13. C. GLAUCUM L. A few plants near Aldborough, v.-c. 16, J. P. M. BRENAN.

600/15. C. POLYSPERMUM L. Waste field, Wotton, Surrey, J. G. LAWN.

600/15b. C. POLYSPERMUM L., var. CYMOSUM Moq. Odiham, N. Hants, v.-c. 12, Lt.-Col. G. WATTS.

606/3b. ATRIPLEX PATULA L., var. ANGUSTISSIMA Gr. & Godr. Near N. Kessock, Beauly Firth, East Ross, v.-c. 106, M. S. CAMPBELL.

†606/10. A. HORTENSIS L. Waste, Hitchin, Herts, 1934, JOSHUA LAMB.

613/1. SALSOLA KALI L. St Ouen's, Jersey, H. PHILLIPS.

615/6×. POLYGONUM LAPATHIFOLIUM × PERSICARIA. Merrow Common, Surrey, v.-c. 17, E. C. WALLACE. Det. C. E. BRITTON.

615/8. P. NODOSUM Pers. Breamore Common, S. Hants, v.-c. 11, P. M. HALL and E. C. WALLACE. Det. C. E. BRITTON.

615/8d. P. NODOSUM Pers., var. ERECTUM Rouy. Breamore Common, S. Hants, v.-c. 11, P. M. HALL and E. C. WALLACE. Det. C. E. BRITTON.

615/10. P. MITE Schrank. Angley Wood, near Cranbrook, v.-c. 16, J. P. M. BRENAN.

615/11a. P. MINUS Huds., var. COMMUNE A. Br. Breamore Common, S. Hants, v.-c. 11, P. M. HALL and E. C. WALLACE. Det. C. E. BRITTON.

615/13. P. RAII Bab. Very sparingly at Portland, Dorset, v.-c. 9, H. S. REDGROVE.

615/15. P. AEQUALE Lindm. Yarmouth, E. Suffolff, v.-c. 25, H. PHILLIPS.

†616/1. Fagopyrum sagittatum Gil. Wootton Bassett, v.-c. 7, J. D. Grose.

618/13. Rumex maritimus L. Pondside near Godstone, Surrey, v.-c. 17, E. C. Wallace.

626/1. Viscum album L. Upon hawthorn, Offley, Herts, L. Males; upon apple, Hitchin, Herts, 1933, J. E. Little; on Acacia at Sutton, near Bignor, W. Sussex, v.-c. 13, E. C. Wallace.

†628/9. Euphorbia virgata W. & K. Hove, Sussex, v.-c. 14, L. A. W. Burder; *near Dumpton Gap, v.-c. 15, A. R. M. Brenan.

628/10. E. Esula L. *Near Owslebury, S. Hants, v.-c. 11, P. M. Hall and H. W. Pugsley.

†628/10b. E. Esula L., var. pinifolia (Lam.) Dr. (*pseudo-cyparissias* Jord.). Near the Dyke, Brighton, Sussex, v.-c. 14, det. Fraser, L. A. W. Burder.

*628/11. E. Cyparissias L. Pembrey Burrows, Carm., v.-c. 44, G. B. Ryle. Comm. A. E. Wade.

628/12. E. Paralias L. Common near the Prince's Golf Club, Sandwich, v.-c. 15, J. P. M. Brenan.

628/13. E. portlandica L. Loe Bar, v.-c. 1, J. D. Grose.

628/15. E. exigua L. Near Lewes, Sussex, J. G. Lawn.

628/15b. E. exigua L., var. retusa DC. Kennack, v.-c. 1, J. D. Grose.

633/6. Ulmus minor Mill. Blunsdon, v.-c. 7, J. D. Grose.

646/2b. Quercus sessiliflora Salisb., var. pubescens Loudon. Planted, Benslow, Hitchin, Herts, 1933. Det. J. E. Little, R. Watson.

650/15. Salix lanata L. Rocks at head of Glen Callater and in Corrie Kandor, S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

650/15×. S. lanata × lapponum. Glen Callater, S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

650/15×. S. lanata × reticulata. Glen Callater, S. Aberdeen, v.-c. 92, R. Mackechnie and E. C. Wallace.

650/18×. S. herbacea × lapponum. Lochnagar, S. Aberdeen, v.-c. 92, E. C. Wallace.

652/1. EMPETRUM NIGRUM L. Rumbold's Moor, Ilkley, W. Riding, Yorks. On millstone grit, 1934, K. D. LITTLE.

664/2. SPIRANTHES SPIRALIS C. Koch, em. Asch. Pewley Downs, Guildford, Surrey, F. CLARKE.

667/2. CEPHALANTHERA GRANDIFLORA (L.) Bab. Lyminge Wood, E. Kent, v.-c. 15, Viscountess GLADSTONE; woods near Wye, W. H. PEARSALL and H. D. STANLEY.

669/6. ORCHIS LATIFOLIA L. (= O. PARDALINA Pugsl.). Eldroth, Mid-West Yorks, v.-c. 64, P. M. HALL and W. A. SLEDGE.

669/7. O. INCARNATA L. Water meadows, near Wareham, Dorset, v.-c. 9, P. M. HALL; Chark Common, near Lee-on-the-Solent, S. Hants, v.-c. 11, P. M. HALL; Kilnsey, Mid-West Yorks, v.-c. 64, P. M. HALL and W. A. SLEDGE; Langdon Beck, Durham, v.-c. 66, a deep red form, P. M. HALL and W. A. SLEDGE.

669/7×. O. INCARNATA L. × O. PURPURELLA Steph. This hybrid has not been previously recorded but single specimens were found at Kilnsey and at Austwick Moss, both v.-c. 64, growing with both putative parents, which could be thus identified with reasonable certainty. Other specimens were also seen at Wharfe Wood, near Austwick, where the *incarnata* hybrid would be var. *pulchella* Dr., P. M. HALL and W. A. SLEDGE.

669/8. O. PRAETERMISSA Dr. Near Steeple, Dorset, v.-c. 9, a very early-flowering and untypical colony, in good flower on May 20th, P. M. HALL; *near Oban, Argyll, v.-c. 98, Miss M. MARTIN.

669/9. O. PURPURELLA Steph. Arncliffe, Kilnsey, Ribblehead, Wharfe Wood, Eldroth and Austwick Moss, Mid-West Yorks, v.-c. 64; *Upper Cronkley pastures, North-West Yorks, v.-c. 65, Langdon Beck, Durham, v.-c. 66, P. M. HALL and W. A. SLEDGE.

669/9b. O. PURPURELLA Steph., var. PULCHELLA (Dr.) Pugsl. Eldroth, Mid-West Yorks, v.-c. 64; *near Colwall, S. Northumberland, v.-c. 67; Newham Bob, Cheviotland, v.-c. 68, P. M. HALL and W. A. SLEDGE.

669/10×. O. MACULATA L. (=ERICETORUM Linton) × O. PURPURELLA Steph. Wharfe Wood, Austwick, Mid-West Yorks, v.-c. 64; Upper Cronkley pastures, North-West Yorks, v.-c. 65; near Langdon Beck, Durham, v.-c. 66, P. M. HALL and W. A. SLEDGE.

669/11×. O. FUCHSII Dr., × O. PURPURELLA Steph. Ribblehead and Kilnsey, Mid-West Yorks, v.-c. 64, P. M. HALL and W. A. SLEDGE.

669/11×. O. FUCHSII Dr., × O. PURPURELLA Steph., var. PULCHELLA (Dr.) Pugsl. Eldroth, Mid-West Yorks, v.-c. 64. The hybrid *O. maculata* L. (=*ericetorum* Linton) × *O. praetermissa* Dr., var. *pulchella* Dr.

(now better treated as a var. of *purpurella* Steph.) has been recorded as *O. scotica* Dr., but this appears to be the first time the hybrid × *Fuchsii* Dr. has been recorded, P. M. Hall and W. A. Sledge.

669/18. Himantoglossum hircinum Koch. South Harting, near Petersfield, W. Sussex, v.-c. 13, Mrs Fitzroy Balders.

*672/4. Ophrys Trollii Heg. An isolated plant at the edge of a wheat-field near Notton, south of Chippenham, N. Wilts, v.-c. 7, O. & E. Milne-Redhead.

674/1. Habenaria Gymnadenia Dr. Very common on dry grassy banks, Achnacloich, Argyll, v.-c. 98, Miss M. Martin.

674/6. H. virescens (Zollik) Dr. Connel, Argyll, v.-c. 98, Miss M. Martin.

*678/1. Crocus nudiflorus Sm. Between Stockton and Newnham Bridge, Worcs., v.-c. 37, Miss Agnes Green.

680/1. Sisyrinchium angustifolium Mill. Several strong clumps in a derelict arable field, Little Park Farm, Swanwick, S. Hants, v.-c. 11, P. M. Hall; in a remote valley on the N. Cornish coast, W. of Bude, one plant growing in a marsh (July 1932) associated with *Eleocharis*. Flowers sent to Herb. Mus. Brit., Dr A. R. M. Brenan. [This is an additional Cornish station. The record given in *Rep.* 1933, p. 557, referred to that previously published in *Rep.* 1912, p. 217—from heathland, Hon. N. C. Rothschild].

684/4. Narcissus poeticus L. Quite common on both sides of the stream below the High Rocks, Tunbridge Wells, v.-cs. 14 and 16, J. P. M. Brenan.

*690/1. Asparagus maritimus Mill. Norton Spit, v.-c. 10. Not in flower, apparently now represented here by two plants only, J. D. Grose.

†690/2. A. officinalis L. In great abundance over the sandhills E. of Sandwich, v.-c. 15, J. P. M. Brenan; St Ouen's Bay, Jersey, H. Phillips.

702/10. Allium sibiricum L. Kynance, v.-c. 1, J. D. Grose.

706/2. Scilla autumnalis L. St Helen's, v.-c. 10, J. D. Grose.

707/1. Ornithogalum pyrenaicum L. Wroughton, v.-c. 7, J. D. Grose.

*711/1. Gagea lutea Gawler. Wexcombe, S. Wilts, v.-c. 8, J. D. Grose.

713/1. Colchicum autumnale L. Woodland near Vernham's Dean, N. Hants, v.-c. 12, P. M. Hall.

715/1. Tofieldia borealis Wahl. Near Cauldron Snout, Upper Teesdale, v.-c. 66, July 2, 1934, Miss Jane Parkin.

718/6. Juncus balticus Willd. Carnoustie, Forfar, R. C. L. Burges.

718/15. J. Gerardi Lois. Saltmarsh, near Carlisle, v.-c. 70, R. C. L. Burges.

718/16. J. macer S. F. Gray. Virginia Water, Berks, Mrs Pemberton Pigott.

*719/3. Luzula Forsteri (Sm.) DC. Cranham Woods, E. Gloster, v.-c. 33, Lady Davy, J. Chapple, and R. Knowling.

719/8. L. spicata DC. Near the summit of Ben Lawers, v.-c. 88, R. C. L. Burges.

721/1b. Typha latifolia L., var. media Syme. Pond near Harlington, Beds, 1925. Det. J. E. Little, H. Phillips.

727/1. Lemna minor L. Excellent examples of this species in flower were sent to me in August by W. G. Travis. They had been found by Mr H. S. Marsh in a shallow ditch near Stoak, Wirral, Cheshire, v.-c. 58, and were subsequently shown by him to the members of the Liverpool Botanical Society at a field meeting on August 11, 1934. All the Duckweeds propagate their species so rapidly by division that flowers would seem to be unnecessary and are very seldom produced. In *L. minor* they spring from clefts on the edges of the fronds and each usually consists of 2 stamens and a pistil enclosed in a tiny bract. This species probably flowers more frequently than any other Duckweed, but even so, few botanists have been privileged to find it. Mr Travis says there is a note in De Tabley's *Fl. Cheshire* to the effect that *L. minor* had previously been found in flower by F. M. Webb in the Liverpool district. [Ed.]

*727/4. L. gibba L. The Lake Hamworthy, west of Poole, Dorset, v.-c. 9. This removes the ? in *Comital Flora*, P. H. Cooke.

*734/1. Butomus umbellatus L. Apparently native in R. Wampool, N. Cumberland; also in R. Eden—both v.-c. 70, John Parkin and Miss Jane Parkin.

737/5. Potamogeton alpinus Balb. Ditch near Byfleet Old Church and ditch near Newark Mill, Surrey, H. W. Kew.

737/9. P. gramineus L., var. fluvialis Fries. Auchenreoch Loch, v.-c. 73, Glenbuck, v.-c. 77, Lochnaw, v.-c. 74, G. Taylor; Loch Ashie, Inverness, v.-c. 96, Miss E. S. TODD; var. LACUSTRIS Fries in canal, Woking, Surrey, H. W. KEW; Loch Fad, Bute, v.-c. 100, J. B. DUNCAN.

737/11f. P. NITENS Weber, var. SUBINTERMEDIUS Hagstr. Lough Creghduff, Roundstone, W. Galway, v.-c. 16, J. CHAPPLE and T. GAMBIER-PARRY.

737/11g. P. NITENS Weber, var. SUBPERFOLIATUS (Raunkiaer) Hagstr. Near Eamont Bridge, Penrith, v.-c. 70, Mrs G. FOGGITT; Auchenreoch Loch, Kirkcudbright, v.-c. 73, G. TAYLOR.

737/13. P. LUCENS L. Dyke on Mepal Fen, Cambs, v.-c. 29, E. C. WALLACE; Symond's Yat, Hereford, J. CHAPPLE, Mr and Mrs FOGGITT.

737/13c. P. LUCENS L., var. LONGIFOLIUS DC. R. Frome, Wool, Dorset, v.-c. 9; R. Avon, near Sopley, S. Hants, v.-c. 11, P. M. HALL and W. H. PEARSALL; Symond's Yat, Hereford, J. CHAPPLE and Mr and Mrs FOGGITT.

737/14d. P. DECIPIENS Nolte, var. LONGIFOLIUS Hagstr. (= UPSALIENSIS Tis.). R. Avon, near Sopley, S. Hants, v.-c. 11, P. M. HALL and W. H. PEARSALL.

737/15b. P. PRAELONGUS Wulf., var. ANGUSTIFOLIUS Graebner. Loch Callater, S. Aberdeen, v.-c. 92, E. C. WALLACE and R. MACKECHNIE.

737/15c. P. PRAELONGUS Wulf., var. BREVIFOLIUS Celak. Wickenlodee, Wicken, Cambs, v.-c. 29, E. C. WALLACE.

737/16c. P. PERFOLIATUS L., var. OVATIFOLIUS Wallr. R. Frome, Wool, Dorset, v.-c. 9, P. M. HALL and W. H. PEARSALL.

737/17. P. CRISPUS L. Loch Ashie, Inverness, v.-c. 96, Miss E. S. TODD; Loch of the Lowes, Selkirk, v.-c. 79, G. TAYLOR.

737/17×. P. UNDULATUS Wolfgang non Fryer (P. CRISPUS × PRAELONGUS). Union Canal, near Falkirk, Stirling, v.-c. 86, G. TAYLOR.

737/18. P. ZOSTERIFOLIUS Schum. Canal, Market Harborough, Leicester, v.-c. 55, Mrs G. FOGGITT.

737/22. P. FRIESII Rupr. Canal, Market Harborough, Leicester, v.-c. 55, Mrs G. FOGGITT; Union Canal, Falkirk, v.-c. 86, G. TAYLOR; ditch by road across Mepal Fen, Cambs, v.-c. 29, E. C. WALLACE.

737/23. P. PUSILLUS L. Pond in claypit near Ridge, Dorset, v.-c. 9; canal near Odiham, N. Hants, v.-c. 12, P. M. HALL (det. W. H. PEARSALL).

737/23b. P. PUSILLUS L., var. TENUISSIMUS M. & K. Pond, Botley Grange, Botley, S. Hants. Ref. 1248, P. M. HALL. This variety is not given in the *L.C.* probably because much of the material so labelled is *panormitanus*. These examples, however, are not that species but *pusillus*. The characteristic lacunae are always present—at least in the lower half of the leaves, W. H. PEARSALL.

*737/24. P. RUTILUS Wolfg. Grangemouth, Stirling, v.-c. 86; Glenbuck, Lanark, v.-c. 77, G. TAYLOR.

737/25. P. PANORMITANUS Biv.-Bern. Fleet Pond, N. Hants, Ref. 1218, P. M. HALL.

*737/27. P. TRICHOIDES Ch. et Schl. Near Weston-super-Mare, North Somerset, v.-c. 6, per Lady DAVY.

739/1. ZANNICHELLIA PALUSTRIS L., a. GENUINA Asch. Grangemouth, Stirling, v.-c. 86, G. TAYLOR; Austwick Moss, Mid-West York, v.-c. 64, P. M. HALL.

739/2b. Z. PEDICELLATA Fries, var. REPTANS (Wallm.) Fries. Fleet Pond, N. Hants, v.-c. 12. Creeping on sand near the margin in about a foot of water, a very slender plant. Probably the first certain record for this species for v.-c. 12, P. M. HALL. Naming confirmed by W. H. PEARSALL.

740/1. ZOSTERA MARINA L. Washed up on shore at Lilliput, Poole Harbour, Dorset, v.-c. 9; in very small quantity in Portscreek, near Cosham, more plentiful off Porchester, in Portsmouth Harbour, S. Hants, v.-c. 11, P. M. HALL.

740/1c. Z. MARINA L., var. ANGUSTIFOLIA Hornem. Brand's Bay, Poole Harbour, Dorset, v.-c. 9; Porchester; Sinah, S. Hayling, S. Hants, v.-c. 11; Prinstead, W. Sussex, v.-c. 13, P. M. HALL.

740/2. Z. NANA Roth. Brand's Bay, Poole Harbour, Dorset, v.-c. 9; Porchester; Sinah, S. Hayling, S. Hants, v.-c. 11; Prinstead, W. Sussex, v.-c. 13, P. M. HALL; *Ferryside, Carmarthen, v.-c. 44, Lt.-Com. E. K. CROCKETT, R.N.; comm. H. A. HYDE, *Journ. Bot.*, lxxii, 58 (February 1934).

744/2. CYPERUS FUSCUS L. In great abundance on Breamore Common, S. Hants, v.-c. 11, Miss GULLICK; only once previously recorded for the county, by W. R. Linton in 1893 from Blashford. 1893 was another exceptionally dry summer. Distributed this year, P. M. HALL.

745/4. ELEOCHARIS ACICULARIS R. & S. Knipe Moor, near Shap, v.-c. 69a, A. WILSON.

746/2e. SCIRPUS MARITIMUS L., var. MONOSTACHYS Meyer. Kildonan, Arran, v.-c. 100, R. MACKECHNIE; Broadsands, Churston Ferrers, S. Devon, v.-c. 3; Estuary of R. Teign, Kingsteignton, S. Devon, v.-c. 3, F. M. DAY.

746/5. S. TRIQUETER L. Still on the right-hand bank of the Medway, near Aylesford Bridge, v.-c. 15, J. P. M. BRENAN.

747/1. ERIOPHORUM LATIFOLIUM Hoppe. Very sparingly near Budleigh Salterton, S. Devon, v.-c. 3, H. S. REDGROVE.

747/2. E. ANGUSTIFOLIUM Roth. Snelsmore, Berks, v.-c. 22, J. D. GROSE.

747/2c. E. ANGUSTIFOLIUM Roth, var. BREVISETUM Dr. Wilderness, I. of Wight, v.-c. 10, J. D. GROSE.

748/1. RYNCHOSPORA FUSCA Ait. Slepe Heath, Dorset, v.-c. 9, H. S. REDGROVE.

749/1. SCHOENUS NIGRICANS L. Slepe Heath, Dorset, v.-c. 9, H. S. REDGROVE.

*750/1. CLADIUM MARISCUS (Pohl.)! Near Achnacloich, Argyll, v.-c. 98, Miss M. MARTIN.

751/1. KOBRESIA CARICINA Willd. Cronkley Fell, Teesdale, v.-c. 65, and Widdybank Fell, v.-c. 66, H. S. REDGROVE.

753/3. CAREX ACUTIFORMIS Ehrh. Canal-side between W. Hyde and Rickmansworth, Herts, Mrs PEMBERTON PIGOTT.

753/6. C. SAXATILIS L. Above 2000 ft. on Ben Lawers, v.-c. 88, R. C. L. BURGES.

753/8. C. LASIOCARPA Ehrh. Austwick Moss, Mid-West Yorks, v.-c. 64, in very poor state, apparently being killed by drought; Newham Bog, Cheviotland, v.-c. 68, P. M. HALL and W. A. SLEDGE.

753/13. C. HELODES Link. Awbridge, S. Hants, v.-c. 11. Possibly new to Townsend's "district vi (2)"—see his *Flora*, 1904, p. 471, Miss B. GULLICK.

753/15b. C. BINERVIS Sm., var. ALPINA Drejer. (*C. Sadleri* Linton). Wet grassy slope in Corrie Kandor, Glen Callater, S. Aberdeen, v.-c. 92, at 2500-2800 ft., R. MACKECHNIE. Det. W. H. PEARSALL.

753/19. C. HOSTIANA DC. Water meadow, near Droxford, S. Hants, v.-c. 11; Killington Common, Westmorland, v.-c. 69, P. M. HALL and W. A. SLEDGE.

753/21. C. LEPIDOCARPA Tausch. Salt Lake, Ribblehead, Mid-West Yorks, v.-c. 64, P. M. HALL; High Force, Durham, v.-c. 66, R. C. L. BURGES.

*753/22. C. OEDERI Retz. Chudleigh Knighton, Heathfield, S. Devon, v.-c. 3, teste W. H. PEARSALL, F. M. DAY.

*753/34. C. PALLESCENS L. High Force, Durham, v.-c. 66, R. C. L. BURGES.

753/49c. C. GOODENOWII Gay, var. FULIGINOSA (A. Br.). Killington Common, Westmorland, v.-c. 69, P. M. HALL and W. A. SLEDGE.

753/51. C. RIGIDA Good. Near the summit of Ben Lawers, v.-c. 88, R. C. L. BURGES.

753/52. C. ELONGATA L. Near the mouth of the R. Rawthay at the head of Windermere, A. WILSON.

*753/57. ×C. AXILLARIS Good. Between Workhouse Green and Cudworth, Surrey, v.-c. 17. Not included in the *Comital Flora* although given in the *Fl. Surrey*, A. L. STILL; near Kenn, v.-c. 6, A. L. STILL.

753/58. C. CANESCENS L. Near Lowestoft, E. Suffolk, v.-c. 25, E. R. LONG; pond edge, near Liphook, Hants, 1934, G. M. ASH; Killington Common, Westmorland, v.-c. 69, P. M. HALL and W. A. SLEDGE.

753/58b. C. CANESCENS L., var. FALLAX F. Kurtz. Boggy slopes on Tolmount, c. 3000 ft., S. Aberdeen, v.-c. 92, R. MACKECHNIE and E. C. WALLACE.

753/62. C. DIVULSA Stokes. Hassocks, E. Sussex, v.-c. 14, Miss L. ABELL; locally common, near Lowestoft, E. Suffolk, v.-c. 25, E. R. LONG.

753/63. ×C. BOENNINGHAUSIANA Weihe. (*C. paniculata* × *remota*). By a pond in Castle Howard Park, N.E. Yorks, v.-c. 6, Mr and Mrs T. J. FOGGITT, and H. W. PUGSLEY.

753/65. C. DIANDRA Schrank. Austwick Moss, Mid-West Yorks, v.-c. 64; Newham Bog, Cheviotland, v.-c. 68; Killington Common, Westmorland, v.-c. 69, P. M. HALL and W. A. SLEDGE.

753/67. C. ARENARIA L. Sandy roadside near Hurn, S. Hants, v.-c. 11, an inland locality, P. M. HALL.

*753/68. C. DIVISA Huds. Marshy ground, near Clarkston, Renfrew, v.-c. 76, R. MACKECHNIE.

*753/75. C. DIOICA L. Tathwell, near Louth, N. Lincoln, v.-c. 54. Teste W. H. PEARSALL. This species was noticed here by the late Dr F. Arnold Lees and Mr C. S. Carter (deceased) long ago as being unusual, but not definitely recorded as *dioica* by either of them. May 22, 1934, Miss C. D. MARSDEN.

754/8. PANICUM CRUS-GALLI L. Roadside ballast, Ovington, N. Hants, v.-c. 12, Dr R. W. BUTCHER.

756/2. SETARIA VIRIDIS (L.) Beauv. Roadside ballast, Ovington, N. Hants, v.-c. 12, Dr R. W. BUTCHER.

756/3. S. GLAUCA Beauv. Gerard's Cross, Bucks, Mrs PEMBERTON PIGOTT.

758/3. SPARTINA TOWNSENDII H. & J. Groves. Near the mouth of the Stour, on the right bank about three miles from Sandwich toward the sea, v.-c. 15, perhaps introduced, J. P. M. BRENAN; Sandlands, v.-c. 9, J. D. GROSE; *Heybridge, N. Essex, v.-c. 19, E. C. WALLACE.

765/5. PHALARIS CANARIENSIS L. Welsh Harp, Hendon, Middlesex, v.-c. 21, W. J. L. PALMER.

770/2b. ALOPECURUS ALPINUS Sm., var. WATSONI Syme. Caenlochan Glen, v.-c. 90; Glas Maol, S. Aberdeen, v.-c. 92, E. C. WALLACE.

770/6. A. FULVUS Sm. Shillinglee Park, W. Sussex, v.-c. 13, E. C. WALLACE.

777/4. PHLEUM ARENARIUM L. St Ouen's Bay, Jersey, H. PHILLIPS.

780/4. A. SETACEA Curt. Near Corfe Castle, Dorset, v.-c. 9, Miss B. GULLICK; heaths on Purbeck Isle, Dorset, in enormous quantities, H. S. REDGROVE.

783/1. CALAMAGROSTIS EPIGEIOS Roth. Border of Withington Woods, Andoversford, v.-c. 33, L. ABELL.

784/1. GASTRIDIUM LENDIGERUM Gaud. In two places near Polstead, W. Suffolk, v.-c. 26, R. BURN.

791/3. DESCHAMPSIA SETACEA Hack. Two places on Purbeck Isle, one of which was shown me by Mr L. B. Hall, H. S. REDGROVE.

*797/1. CYNODON DACTYLON Pers. Apparently well established at one locality in S.W. Essex, v.-c. 18. Vouching specimens sent to Secretary, P. H. COOKE; *very flourishing on garden path at Salisbury, v.-c. 8, Miss B. GULLICK; shown me by Mr L. B. Hall at Sandbanks, Dorset, H. S. REDGROVE.

809/4. KOELERIA ALBESCENS DC. Chesil Beach, near Portland, Dorset, H. S. REDGROVE.

824/3. POA SUBCAERULEA Sm. Boughrood, Radnor, Lady DAVY, J. CHAPPLE and R. KNOWLING.

824/10. P. COMPRESSA L. Billingshurst, W. Sussex, v.-c. 13, E. C. WALLACE.

824/10c. P. COMPRESSA L., var. POLYNODA (Parn.), teste W. O. Howarth. Near Ribblehead, Mid-West Yorks, v.-c. 64, P. M. HALL and W. A. SLEDGE.

827/18. BROMUS RACEMOSUS L., teste W. O. Howarth. Water meadow, near Droxford, S. Hants, v.-c. 11, P. M. HALL and H. W. PUGSLEY.

826/18. FESTUCA MYURUS L. Near Downton Church, S. Wilts, v.-c. 8, Miss B. GULLICK.

830/1. TRITICUM REPENS × JUNCEUM = HACKELII Dr. St Ouen's Bay, Jersey, H. PHILLIPS.

†835/7. HORDEUM JUBATUM L. Chicken run, Wallington, Surrey. v.-c. 17, A. L. STILL.

†835/11. H. HEXASTICHON L. Waste heap, Welwyn, Herts, H. PHILLIPS.

844/9d. EQUISETUM VARIEGATUM Schleich, var. ARENARIUM Newm. Southern end of Braunton Burrows, N. Devon, v.-c. 4, Lady DAVY.

864/1. OSMUNDA REGALIS L. I saw this growing wild in Surrey this year, and also in Ashdown Forest, East Sussex a year or two ago, E. C. WALLACE; Tremethick Moor, v.-c. 1, J. D. GROSE.

866/1. OPHIOGLOSSUM VULGATUM L. Grassy shingle, Dungeness, East Kent, v.-c. 15, E. C. WALLACE.

†868/1. AZOLLA FILICULOIDES Lam. Pool in Norton Hall Park, near Worcester, Miss L. ABELL.

*869/2. ISOETES ECHINOSPORA Dur. Bodmin Moor, E. Cornwall, v.-c. 2, C. OLDHAM, *Journ. Bot.* lxxii, 177 (June 1934); *also recorded from Tavistock district, S. Devon, v.-c. 3, by W. P. HIERN in 1909. F. A. BROKENSHIRE, *loc. cit.*, 259 (September 1934).

872/2. NITELLA OPACA Agardh. Loch Callater, S. Aberdeen, v.-c. 92, E. C. WALLACE.

872/5. N. TRANSLUCENS Ag. Pond in claypit near Ridge, Dorset, v.-c. 9; Botley, S. Hants, v.-c. 11, P. M. HALL.

876/3. CHARA VULGARIS L., var. LONGIBRACTEATA Kütz. Canal, near Odiham, N. Hants, P. M. HALL.

NOTES ON THE UMBELLIFERÆ.

W. H. Pearsall.

Many amateur botanists confess to finding it difficult to distinguish between the various species of this Order and therefore pass it by. It is commonly assumed that ripe fruits are absolutely necessary before most species can be named, but this is by no means the case, or most of the plants sent in for determination would never be named. They are usually gathered on holiday or at other times when no fruits are available, and this paper is an attempt to indicate various lines of approach to their determination and also to a fuller knowledge of these plants for those desirous of acquiring it.

A.

The easiest method of study is to begin with the umbellate species earliest in flower. A walk down any country lane in Spring (April or May) will afford abundant examples of our commonest species—(i) the Wild Chervil (Pig's Parsley, Keck, Wild Beaked Parsley), *Chaerophyllum sylvestre* L. (*Anthriscus sylvestris* Hoffm.), a plant up to 5 feet in height. You can motor for miles during May along lanes bordered with the white flowers of this species and as no other common umbelliferous plant is in flower its identity is easy and certain. Its tiny flowers are borne in umbels of 8-10 smooth rays, suggesting the ribs of an open umbrella (Lat. *umbella*, a sunshade). These umbels are compound, a smaller one (umbellule) at the end of each ray of the main larger umbel. The number of rays in an umbel is often a most useful character (see C), varying from 3-4 in *Caucalis daucoïdes* to as many as 30-40 in *Angelica sylvestris*. At the base of the main umbels of Wild Chervil there is no general involucre of bracts, but there are partial involucres of five lanceolate densely ciliate bracteoles at the bases of the small terminal umbellules. These often afford valuable aids to the identification of species and should be carefully noted. They are often very small and so closely pressed against the rays that they are overlooked and a wrong determination may result. Long after its flowers are over, this species is a very conspicuous feature of waysides and hedgerows. After the middle of May its fruits may be readily examined. They are about ¼ in. long, narrowed at the top, very smooth and shining, and without ribs. No other umbelliferous plant has exactly similar fruits, so it is well to retain an accurate visual impression of these, and as you will see them so often this is easily acquired. With a sharp penknife cut horizontally across the middle of one of the fruits, throw the top half away and with a lens look down on the cut face of the lower half. Note the two circles having greens rims, white interiors with small black circles where they join. Compare your mental picture of these with fig. 445 of Fitch's Illustrations when you get home. On the left you will see the fruit (in front view) and on the right one (only) of the two circles—the other one should be shown below that and joined to it. All these figures of sections are enlarged and should be shown as in fig. 407 or fig. 410. The two halves are really hinged together and finally split as shown in fig. 428.

The leaves are pinnate, much dissected and fern-like in shape, but as those of many other species are very similar they are not easy to identify, but their general appearance should be contrasted with that of the next species. Following quickly upon the Wild Chervil (*Chaerophyllum sylvestre*) comes (ii) Goutweed (Bishopsweed, Herb Gerard), *Aegopodium Podagraria* L. This flowers in June and can be readily distinguished at a glance. It is a smaller plant—seldom over 2 ft. in height—and its flowers are very neatly arranged in small, compact, rounded heads nearly touching, and together forming a larger rounded head which may be 2½ in. across and contain 12-20 of the smaller heads, one at the end of each ray of the umbel. This, therefore, possesses more rays (12-20) than that of *C. sylvestre* (8-10) but resembles it in having no general involucre. A marked difference, however, is noted in the absence of a partial involucre to any of the umbellules. These possess no bracteoles corresponding to the five of *C. sylvestre*. The fruits are distinguished at once, being much smaller and strongly ribbed. Cut one across and compare each half of the section with fig. 409 of Fitch; the ribs stick out as tiny prominences on the margin. The difference in the shape of the leaves is very marked and affords a ready means of determination even at a distance. Those of Goutweed are ternate—divided into three broad leaflets at the end—and therefore totally different from those of (i). The radical leaves are on very long stalks and twice ternate. A careful examination and study of the leaves of (i) and (ii) gives valuable aid in understanding the terms 2-3 pinnate and 2-3 ternate respectively, both of which are frequently used in this Order. When Goutweed is in flower (May-June) we may expect to find by the wayside—and especially in woods—the well-known (iii) Pignut or Earthnut, *Conopodium denudatum* Koch (*Carum majus* Rendle & Brit., *C. flexuosum* Fries, *Bunium flexuosum* With.). It is a much smaller and more slender species than either of the preceding and can be distinguished from both by its very few stem leaves having linear segments—mere threads—and the root being a small edible tuber. (This species is given as *Conopodium majus* Loret in the *Lond. Cat.* and *Oxford List* but as *C. denudatum* Koch in the *Comit. Fl.*).

During the same months (May-June) another common species (iv) Sweet Cicely (*Myrrhis Odorata* Scop.) may be found blooming, especially in the North and usually near buildings. Its leaves resemble those of Wild Chervil but are larger, often blotched with white, and when bruised smell strongly of aniseed. Its fruits are twice as large as those of (i)—often nearly an inch long—and with very prominent ribs. The plant very much resembles (i) and is often passed by botanists from southern counties (where it is unknown) as being that species. The next common umbelliferous species to flower is (v) ROUGH CHERVIL (*Chaerophyllum temulum* L.), which is found along hedgerows in June and July. It, again, is very similar to (i) but can be readily known by the following characters:—It is at its best a month later; its leaf-segments are not long and pointed as in *C. sylvestre* but short and obtuse; its stem is rough below, hairy near the top, purple-spotted and swollen below the joints; the umbel rays are unequal and the fruits have obtuse ribs and styles short, curved and spreading. Later still (July-September) appears (vi) UPRIGHT HEDGE PARSLEY (*Caucalis Anthriscus* Lam., *Anthriscus vulgaris* Bernh., *Torilis Anthriscus* Gmel.). This is easily recognised by its fruits, ⅛ in. long, covered with short curved reddish prickles—not hooked at the tip as in *Caucalis arvensis*—its general involucre of small subulate bracts one under each ray and closely pressed against it. The whole plant is very rough to the touch. *C. arvensis* is a smaller plant, much less widely distributed and has usually no general involucre but occasionally shows one bract only.

By the time you have identified the foregoing six species the (vii) COW PARSNIP or Hogweed (*Heracleum Spondylium*) will be in evidence everywhere. This is a very large, rough and coarse plant, with extremely large pinnate leaves having very broad acute segments. Its large umbels have about twenty rays and dirty-white, cream-coloured or reddish flowers. Its most striking character—the leaf-sheath—is rarely mentioned in descriptions but is one of the first things to strike an observer. A mature radical leaf may be from 1-3 ft. long and have leaflets 9 inches broad. At its base the stalk widens out into a broad and long sheath which passes entirely round the stem and when this is in bud completely encloses it, the edges overlapping and the whole forming a conspicuous knob as large as an egg. Another noticeable feature is that the flowers in the centre of the ring are smaller and regular, those on the outside are irregular, the outermost being much larger than any of the others. It is clear that where there was room for them to increase they did so. These enlarged flowers—" flags " as Lubbock calls them—are to attract insects to the plant, and at the same time they do not unduly interfere with the normal functions of the other flowers.

So far we have dealt only with seven of the most common species in the order of their appearance in flower. There is nothing like out-of-door observation of the living plants to enable you to detect small differences not found in book descriptions but of the greatest help in determination. A blind botanist could tell in an instant the difference between Wild Chervil and Goutweed by fingering the stems—one is round and nearly smooth, the other deeply furrowed and ribbed, as are also the rays of the umbel. If by the end of the season you are able to distinguish the seven species here briefly described you will have made a good start, as each species identified and easily recognised leaves one less to puzzle and confuse.

B. COLOUR.

While the great majority of the species of this Order have white flowers, many have flowers of another colour, and even the white-flowered species often show flowers which are pink. We will therefore proceed to eliminate these.

BLUE.

(viii) *Eryngium maritimum* L. Sea Holly. Sandy and shingly seashores. Leaves spinous.

(ix) *E. campestre* L. Very rare. Dry grassy places. Flowers bluish-white or purplish.

YELLOW.

(x) *Bupleurum rotundifolium* L. Hare's-ear. Cornfields on chalk. Leaves oval, perfoliate. Rays 4-8. Bracts 0.

(xi) *B. falcatum* L. 1½-4 ft. Leaves linear, grass-like, recurved. Very rare. Hedges and roadsides in Surrey and Sussex only. Rays 4-10. Bracts 1-4. August-September.

(xii) *B. aristatum* Bartl. 2-8 in. Very rare, dry places near the sea, S. Devon and E. Sussex only. July.

(xiii) *B. tenuissimum* L. 6-12 in. Very slender and wiry. Umbels minute, with 2-5 very short and unequal rays. Saltmarshes, August-September.

(xiv) *Carum Petroselinum* L. Common Parsley. Often appears as a garden escape in waste places and on walls, rocks and railway banks, and is a constant source of difficulty to many.

(xv) *Smyrnium Olusatrum* L. Alexanders. Waste places, and on rocks or ruins, especially near the sea. Plant shining. Leaves bright yellow-green, ternate with very large broadly ovate segments, totally different from the pinnate leaves of (xiv).

(xvi) *Foeniculum vulgare* Mill. Fennel. Cliffs, rocks and walls near the sea. Leaves dark green with narrow hair-like segments and swollen leaf-sheaths. Involucre 0. Flowers dark yellow.

(xvii) *Peucedanum officinale* L. Hog's Fennel. Very rare. Saltmarshes in Kent and Essex only. Leaves with very long linear segments. Umbels large, of 20-30 rays. Flowers pale yellow.

(xviii) *Pastinaca sativa* L. (= *Peucedanum sativum* B. & H.). Wild Parsnip. Roadsides, railway banks, quarries, hedgebanks on chalk. Flowers bright yellow. Leaves shining, with 2-5 pairs of ovate leaflets. Bracts and bracteoles 0. July-August.

(xix) *Silaus flavescens* Bernh. Pepper Saxifrage. Damp pastures. 1-2 ft. Flowers pale yellow. Leaflets few, lanceolate, entire or 3-lobed. Umbel of 6-8 rays, incurved. July-September.

(xx) *Meum athamanticum* Jacq. Bald-money. Spignel. Dry mountain pasture in N. Eng., Wales and Scotland. Flowers whitish-yellow, white or purplish. Leaf-segments bristle-like, very numerous, short and spreading in all directions.

PINKISH.

Many species of the Umbelliferæ produce flowers which may be either white or pinkish. In case you meet with any of these the following list may be helpful:—

(xxi) *Astrantia major* L. An alien completely naturalised in the woods of some hilly districts. Very rare. Leaves with 3-7 ovate-lanceolate, serrate lobes. Involucre straw-coloured.

(xxii) *Tordylium maximum* L. Another very rare alien, only recorded for five southern counties. Umbels small, of 6-8 short, stout, hispid rays. Fruit ± round, much flattened from back to front and with a very prominent thickened margin. Petals small, reddish or pink, the outer larger.

Caucalis. All species of this genus can be distinguished easily by their prickly fruits, and even when in flower the young ovaries show this character. The umbels, too, have fewer rays than those of any other genus.

(xxiii) *Caucalis daucoides* L. Cornfields on chalk and waste places generally. Umbels of only 3-4 rays. Fruits larger than in the following species, often more than $\frac{1}{4}$ in. long with long stout prickles. General involucre of 0-1 bract. A decreasing species. June.

(xxiv) *C. arvensis* Huds. Hedges, roadsides and fields. Umbel rays 2-8. Fruits very small ($\frac{1}{6}$ in.), prickles hooked at the tip.

(xxv) *C. nodosa* Scop. (*Torilis nodosa* L.). Dry sunny banks and waste places; more common than any other species of Caucalis except *C. Anthriscus* (see vi). Umbels (of only 2-3 rays) contracted into little sub-globular heads. Fruits as in (xxiv).

(xxvi) *C. latifolia* L. Cornfields on chalk in the Southern counties. Very rare. Flowers large, pink or purplish, outer petals larger. Leaves simply pinnate, much less divided than in other species. Fruit larger than in the two preceding species, prickles long, nearly equal, rough. Umbel rays 2-4.

(xxvii) *Carum verticillatum* L. Grassy places chiefly in the Western counties. Leaves with very short linear segments and apparently in whorls. Flowers sometimes pink.

(xxviii) *Pimpinella major* Huds. Woods and waysides on basic soils. Much larger than *P. Saxifraga*, which prefers chalk. Flowers often rose-coloured.

(xxix) *Ligusticum scoticum* L. Scottish Lovage. Rocks and grassy places near the coast of Scotland. Leaves ternate. Umbel of 12-20 rays.

GREEN.

(xxx) *Archangelica officinalis* Hoffm. Occasionally on river banks and in waste places. Leaves and flowers bright green. Not native.

C. RAYS OF THE UMBEL.

The following list is one of many ways of limiting one's area of search for a name, and, used in conjunction with a Flora and the other sections of this paper, will often result in the unknown plant being identified. The species are arranged in the order of their increasing average number of rays. The figures in brackets denote the number only occasionally and rarely found.

Apium inundatum, 2-3.
Scandix Pecten-veneris, 2-3.
Caucalis nodosa, 2-3.
C. latifolia, 2-4.
Bupleurum tenuissimum, 2-5.
Caucalis daucoides, 3-4 (5).
Bupleurum aristatum, 2-6.
B. rotundifolium, 3-5 (6).
Œnanthe fistulosa, 3-5 (7).
Anthriscus cerefolium, 3-5.
Astrantia major, 3-5.
Sison amomum, 3-5.
Carum segetum, 3-6.
Apium graveolens, 3-6.
Caucalis Anthriscus, 3-7.
C. arvensis, 2-8.
Chaerophyllum Anthriscus, 3-7.
=(*Anthriscus vulgaris*).
Apium nodiflorum, 4-8.
Trinia glauca, 4-8.
Bupleurum falcatum, 4-8 (10).
Coriandrum sativum, (3) 5-8.
Silaus flavescens, 6-8.
Tordylium maximum, 6-8 (10).
Caucalis Anthriscus, 5-12.
Chaerophyllum temulum, 6-12.
Œnanthe Phellandrium, 6-12 (14).
Carum Carvi, (6) 8-10 (12).
Chaerophyllum sylvestre, 8-10.
Carum verticillatum, 8-10 (15).
Myrrhis Odorata, (6) 8-10 (15).
Œnanthe pimpinelloides, 7-12.
Œ. Lachenalii, 7-12 (20).
Conopodium denudatum, 7-12.
Smyrnium Olusatrum, 8-12 (15).
Pastinaca sativa, 8-12.
Æthusa Cynapium. (5) 8-12.
Sium angustifolium, 8-12 (20).
Pimpinella major, 8-16.
P. Saxifraga, 10-15.
Selinum Carvifolia, 10-15 (20).
Meum Athamanticum, 10-15.
Falcaria vulgaris, 10-15 (20).
Conium maculatum, 10-15 (20).
Cicuta virosa, 10-15 (25).
Carum Bulbocastanum, 8-20.
Danaa cornubiensis, 10-20.
Ægopodium Podagraria, 12-20
Ligusticum scoticum, 12-20.
Crithmum maritimum, 15-20.
Carum Petroselinum, 15-20.
Fœniculum vulgare, 15-20 (30).
Œnanthe crocata, 15-20 (40).
Heracleum Sphondylium, 15-20 (30).
Peucedanum palustre, 15-30.
P. officinale, 20-30.
Seseli Libanotis, 20-30 (40).
Sium latifolium, 20-35.
Peucedanum Ostruthium, 20-40 (50).
Daucus Carota, 20-40.
Angelica sylvestris, 30-40.

D. INVOLUCRES.

It may happen that the plant found possesses either (i) no general involucre of bracts or (ii) no partial involucre of bracteoles. In rare cases it may possess (iii) neither bracts nor bracteoles. In any of these cases its name will probably be found in the appropriate list below.

(i) NO BRACTS.

Apium inundatum.
A. graveolens.
Ægopodium Podagraria.
Trinia glauca.
Carum Carvi.
Cicuta virosa.
Myrrhis Odorata.
Œnanthe fistulosa.
Œ. Phellandrium.
Pimpinella Saxifraga.
P. major.
Foeniculum vulgare.
Coriandrum sativum.
Caucalis arvensis.
C. daucoides.
Chaerophyllum temulum.
C. sylvestris.
C. Anthriscus.
Aethusa Cynapium.
Heracleum Sphondylium.

Bupleurum rotundifolium.
Scandix Pecten-veneris.
Silaus pratensis.
Smyrnium Olusatrum.
Pastinaca sativa.
Conopodium denudatum.

(ii) NO BRACTEOLES.

Conopodium denudatum.
Pimpinella Saxifraga.
P. major.
Ægopodium Podagraria.
Smyrnium Olusatrum.
Pastinaca sativa.
Apium graveolens.
Trinia glauca.
Foeniculum vulgare.

(iii) NEITHER BRACTS NOR BRACTEOLES.

Conopodium denudatum.
Pimpinella Saxifraga.
P. major.
Ægopodium Podagraria.
Smyrnium Olusatrum.
Pastinaca sativa.
Apium graveolens.
Trinia glauca.
Foeniculum vulgare.

It must, however, always be remembered that in any of the above cases a species may produce 1 or 2 small bracts or bracteoles—on occasion—and these are apt to puzzle those who expect plants always to conform to the book descriptions. To give but one example: *Caucalis daucoides*—Babington gives "gen. inv. 0"; Benth. & Hook. "one bract"; Hooker's *Stud. Fl.* "few or 0"; Coste *Fl. Fr.* ii, 162, "0-1-2," but there are occasionally 3, and that number occurred on the umbels of this species recorded in the present Report.

E. HABITATS.

While the majority of umbelliferous species are usually found on roadsides, hedgebanks, and in waste places generally, there are certain species which have a decided preference for particular habitats. So much is this the case that the study of the influence of the habitat upon its plants has become one of the most valuable and fascinating branches of botanical science. In the following short list of habitats are given the names of species you may expect to find in each. Make a more exhaustive list from your own experiences and correct it from time to time. When you find a plant you have always associated with bogs or marshes growing freely on dry chalk downs or among sandhills, try and ferret out the reason.

(i) NEAR (or in) WATER. River-banks, margins of ponds, pools, lakes or broads; ditches.

Apium species.
Sium latifolium.
S. angustifolium.
Fœniculum vulgare.
Angelica sylvestris.
Peucedanum palustre.
Smyrnium Olusatrum.
Œnanthe crocata.
Œ. Phellandrium.
Œ. fistulosa.
Œ. Lachenalii.
Œ. fluviatilis.
Cicuta virosa. (v.r.)

(ii) BOGS AND MARSHES.

Hydrocotyle vulgaris.
Apium graveolens.
Sium erectum.
Chærophyllum sylvestre.
Angelica sylvestris.
Selinum Carvifolia.
Œnanthe crocata.
Œ. Lachenalii.
Œ. Phellandrium.
Peucedanum officinale.
P. palustre. (r.)
Carum verticillatum. (v.r.)

(iii) CHIEFLY NEAR THE COAST. Sandy and shingly shores; sea-cliffs, rocks, ruins and waste places; dunes and dry grassy places.

Eryngium maritimum.
E. campestre. (v.r.)
Fœniculum vulgare.
Smyrnium Olusatrum.
Crithmum maritimum.
Bupleurum aristatum (v.r.)
Ligusticum scoticum.
Caucalis arvensis.
Daucus gummifer.

(iv) SALTMARSHES.

Bupleurum tenuissimum.
Œnanthe Lachenalii.
Peucedanum officinale. (v.r. Kent and Essex only).

(v) WOODS AND COPSES.

Sanicula europæa.
Angelica sylvestris.
Heracleum Sphondylium.
Conium maculatum.
Pimpinella major.
Conopodium denudatum.
Astrantia major. (v.r.)
Danaa Cornubiensis. (v.r.)

(vi) HEDGEBANKS AND SHADY PLACES.
Many species, but especially the following:

Ægopodium Podagraria.
Chærophyllum sylvestre.
C. Anthriscus
C. temulum.
Conium maculatum.
Carum segetum.
C. Petroselinum.
Heracleum Sphondylium.
Sison Amomum.
Bupleurum falcatum. (v.r.)

(vii) DRY GRASSLAND.

Conopodium denudatum.
Pimpinella Saxifraga.
Daucus Carota.
Eryngium campestre.
Anthriscus sylvestris.
Silaus flavescens.
Heracleum Sphondylium.
Meum athamanticum.

(viii) CHALK DOWNS, cornfields and pits.

Pimpinella Saxifraga.
Seseli Libanotis.
Daucus Carota.
Peucedanum sativum.
Conopodium denudatum.
Caucalis latifolia.
Pastinaca sativa.
Caucalis daucoides.
Scandix Pecten-veneris.
Carum Petroselinum.
C. Bulbocastanum.
Bupleurum rotundifolium.
Trinia glauca.
Sison Amomum.

F. KEY TO THE UMBELLIFERÆ.

1. Ls. *entire* or merely crenate 2
Ls. *pinnate* or *ternate* or *fern-like* 3
2. Ls. entire, roundish-oval, embracing the stem (*rotundifolium*), or narrow-linear (3 other species). Flowers yellow .... *Bupleurum*
Ls. suborbicular, peltate. Creeping marsh plant. Minute white flowers .... *Hydrocotyle*

3. Ls. very prickly. Flowers *pale blue* (Sea Holly) .... *Eryngium*
Ls. and stems very thick and fleshy. Flowers minute, *greenish-white* (Samphire) .... *Crithmum*
Ls. neither prickly nor fleshy 4

4. Fruits hairy or covered with prickles 5
Fruits glabrous and smooth 11
Fruits with crumpled ribs. V.R. (See B xxi) .... *Astrantia*

5. Ls. ternate or palmate, with 3-5 ovate serrate lobes. Flowers in small heads. No involucres. Fruits prickly (Wood Sanicle) .... *Sanicula*
Ls. pinnate or fern-like 6

6. Fruits covered with prickles or hairs 7
Fruits glabrous, with wavy crenate ribs. Tall plant (3-5 ft.) with purple-spotted stem .... *Conium*

7. Fruits much flattened, with a very prominent thickened margin. V.R. (5 southern counties) .... *Tordylium*
Fruits ovoid; no thick margin 8

8. Bracts of the involucre mostly divided; common in fields and near the sea .... *Daucus*
Bracts entire, or none present 9

9. Umbels of more than 20 rays, with many bracts. Fruits hairy. (On the chalk, 4 counties only) .... *Seseli*
Umbels of fewer rays (usually less than 10, never more than 12). Bracts few or 0 10

10. All the fruit very smooth and shining .... *Chærophyllum sylvestre*
Most of the fruit covered with short hooked bristles but the top is narrowed into a very short smooth beak .... *Ch. Anthriscus*
All the fruit covered with straight, curved or hooked bristles ... *Caucalis*

11. Fruits much flattened 12
Fruits round, oval or oblong—never much longer than broad 16
Fruits at least 4 times as long as broad 42

12. Fruit surrounded by a *double* wing, even before it is ripe Very common; found in every vice-county .... *Angelica*
Fruit with a *single* wing before the carpels ripen and separate 13

13. Flowers *yellow* 14
Flowers *white, cream-coloured* or *reddish* 15

14. Flowers bright yellow. Ls. shining, with 2-5 pairs of ovate leaflets. Bracts and bracteoles 0. Railway banks, quarries, hedgebanks on chalk .... *Pastinaca*
Flowers pale yellow, minute. Ls. with very long linear segments. Bracts few or 0; bracteoles short, filiform. V.R. Saltmarshes, Kent and Essex .... *Peucedanum officinale*

15. Outer petals much larger than the others. Large coarse plant with very large pinnate ls. having very large acute segments and very broad basal sheaths. Very common, found in every v.-c. (Hogweed) .... *Heracleum*
Ls. with milky juice and segments rarely over ½ in. long, lin.-lanc., with a hard point. Umbels of 15-30 rays. Marshes and fens; rare .... *Peucedanum palustre*
Ls. large, twice ternate. Umbels of 30-50 rays. Rare. Moist meadows in N. Brit. .... *Peucedanum Ostruthium*

16. Flowers *yellow* 17
Flowers *white* 20

17. Ls. bright yellow-green, 2-3 times ternate with very large broadly-ovate segments. Fruits dark brown or black; aromatic; section shows 2 circular carpels each with 3 acute ribs .... *Smyrnium*
Ls. pinnate or much dissected. Fruits ovoid or oblong 18

18. Lf.-segments round and thread-like. Fruit oval. Bracts and bracteoles 0 ...... *Foeniculum*
Lf.-segments flat, narrow-lanc., or 3-lobed 19

19. Ribs of fruit (4 mm.) acute, prominent. Rays of umbel 6-8, incurved. Bracts 0 ...... *Silaus*
Ribs of fruit (2.5 mm.) rounded, not prominent. Rays of umbel 15-20. Bracts 2-5 ...... *Carum Petroselinum*

20. Only the central nearly sessile flowers fertile (producing fruits), outer flowers stalked and barren ...... *Œnanthe*
Fertile flowers stalked 21

21. Ls. 2-3 times ternate, with very large segments 22
Ls. simply pinnate. Segments sessile, ovate, lanceolate or cut 24
Ls. much dissected. Segments small or narrow, the lower pedicellate 28

22. Umbels all terminal and stalked 23
Umbels mostly lateral and sessile ...... *Apium*

23. Bracts and bracteoles 0 ...... *Ægopodium*
Bracts few or 0; bracteoles many (Scotland) ...... *Ligusticum*

24. Bracts and bracteoles 0 ...... *Pimpinella*
Bracteoles several 25

25. Umbels terminal 26
Umbels mostly lateral 27

26. Ripe fruits longer than broad, at least 4 mm. long, often 10-14 mm. 42
Ripe fruits less than 4 mm. long (usually 2-3 mm.). Rays of umbel 8-35 ...... *Sium*
Ripe fruits nearly round, rather broader than long (2 mm.). Rays of umbel 3-5 ...... *Sison*

27. Involucres of several bracts ...... *Sium*
Bracts 0 or 1 ...... *Apium*

28. Umbels mostly lateral and almost sessile 29
Umbels all terminal or pedunculate 30

29. Rays usually not exceeding 6. Ls. with few, ovate segments ...... *Apium*
Rays usually 6-12. Ls. 2-3 times pinnate with many small segments ...... *Œnanthe Phellandrium*

30. Plants under 1 ft. in height. Very rare ...... *Trinia*
Plants between 1-2 ft. in height 31
Tall plants, usually over 2 ft. in height 32

31. No bracts nor bracteoles. Flowers white or pinkish ...... *Pimpinella*
Bracteoles 3-5, long, linear (often bifid or trifid), *pointing downward*. No other Umbellifer possesses this character. Flowers white (Fool's Parsley) ...... *Aethusa*
No bracts. Flowers pale yellow. Umbel of 6-8 incurved rays *Silaus*
Uppermost ls. with few slender linear segments. Foetid odour when bruised. Umbels terminal of 5-8 rays. Flowers white. No bracts, a few small bracteoles. Fruits globular, 4 mm. diam., carpels not separating. Stem nearly leafless ...... *Coriandrum*
Umbels long-peduncled and terminal of 10-12 rays. Flowers white. Radical ls. long-stalked, 2-3 times trifoliate. Fruit broader than long, of 2 tiny smooth bladders each containing a loose seed. V.R. Cornwall, Devon and Bucks only ...... *Physospermum*

32. Fruits nearly globular or broader than long 33
Fruits longer than broad 37

33. Plants with general and partial involucres. Fruits very small (2 mm.), globular, rather broader than long, carpels separating into 2 (cf. *Coriandrum*) ...... *Sison*
Partial involucres of several bracteoles—bracts few or 0 34
No involucres—(bracts and bracteoles 0) 36

34. Flowers pale yellow or yellowish-green. Ribs of fruit acute (See 31) .... *Silaus*
Flowers white. Ribs of fruit obtuse 35

35. Fruit very small (2 mm.), with prominent calyx-teeth. Bracts 0, bracteoles several. Lf.-segments narrow .... *Cicuta*
Fruit 4 mm. Calyx-teeth inconspicuous or absent. Bracts variable, bracteoles usually 3, *turned to the outside*. Stem *purple-spotted* (See 6) .... *Conium*

36. Plants often over 2 ft. high (cf. 31) .... *Pimpinella*

37. Lf.-segments hair-like and apparently whorled 38
Lf.-segments flat, narrowly lanceolate or linear, not whorled ... 39

38. Leaf-stalk simple. Fruits 4 mm. Flowers white or pinkish *Carum verticillatum*
Leaf-stalk branched. Fruits 6-8 mm. Flowers white, whitish-yellow or purplish. Dry mountain pastures (Wales and N. Brit.) .... *Meum*

39. Rootstock a round tuber 40
Rootstock not tuberous 41

40. (Two plants known as Pignut).
(a) Plant *very common*. Styles erect. No bracts nor bracteoles. Ribs of fruit obscure .... *Conopodium*
(b) Plant *very rare*,, 4 vice-counties only, on chalk. Styles closely reflexed. Involucres always present. Ribs of fruit prominent .... *Carum Bulbocastanum*

41. Umbels of 3-5 very unequal rays .... *Carum segetum*
Umbels of 7-10 very unequal rays. Calyx teeth not conspicuous *Carum Carvi*
Umbels of 10-20 rays. Calyx-teeth prominent .... *Œnanthe*

42. Fruits ¾ in. to over an inch long 43
Fruits not ½ in. long 44

43. Fruits with conspicuous ribs along their entire length (See A iv) *Myrrhis*
Fruits 1-3 inches long. Beak very long (3-4 times the carpel), flattened and smooth. Base of fruit only, slightly ribbed ... *Scandix*

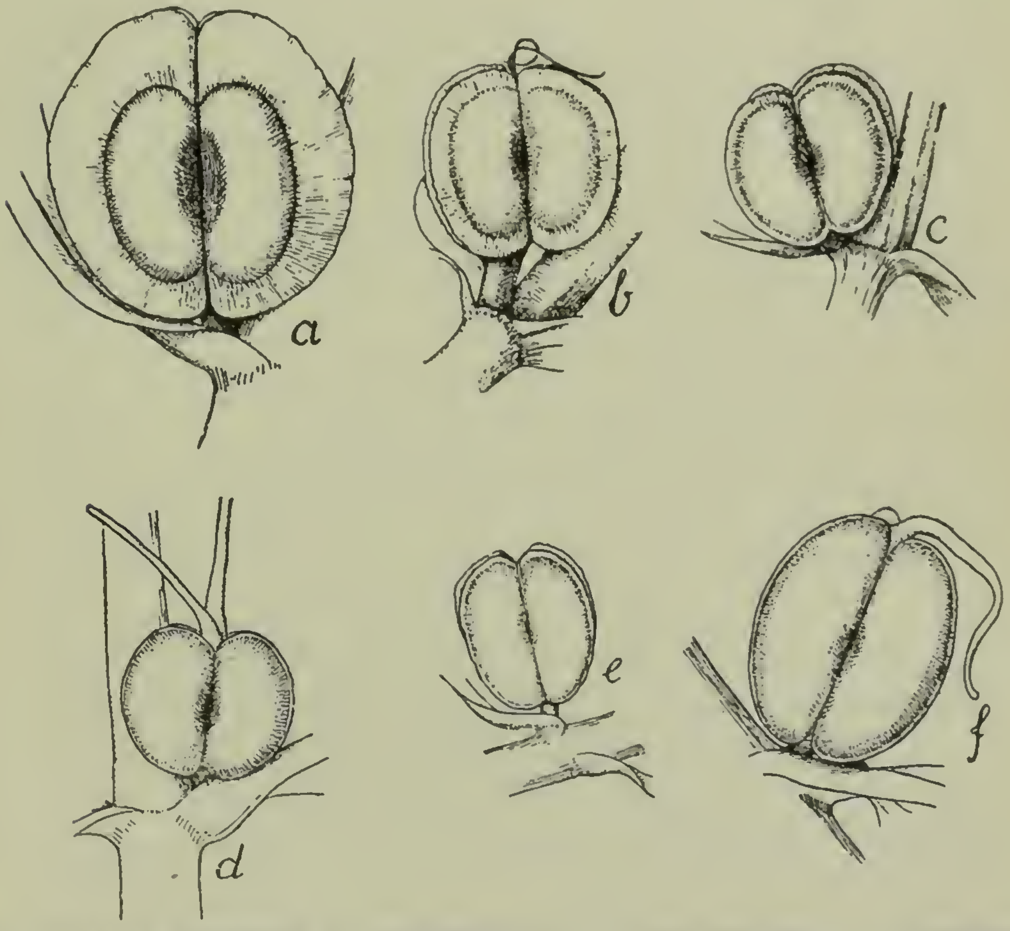
44. All fruits stalked (See also 10) .... *Chærophyllum*
Most of the fruits sessile (See also 20) .... *Œnanthe*

THE BRITISH SPECIES OF CALLITRICHE.

W. H. PEARSALL.

This genus has for long been in an unsatisfactory condition owing to a variety of causes. Probably the most potent is the fact that the earliest descriptions of many of the species are too brief and indefinite for the certain determination of plants. As a result subsequent authors have held divergent views as to the plants intended and have amplified or modified the original description in accordance with their own varying conceptions. The cumulative effect of this will be gathered from a study of the synonymy of the several species.

Another reason for much of the existing confusion is the slovenly manner in which these plants are usually presented. In their native element many of the species are extremely beautiful—as their name sug-



a. *Callitriche autumnalis* L., em. Wahlenb. b. *C. stagnalis* Scop. c. *C. hamulata* Kütz. d. *C. polymorpha* Lönnr. e. *C. verna* L., em. Lönnr. f. *C. obtusangula* Le Gall. (All × 13).
(By permission of Prof. Gunnar Samuelsson.)

gests—but few collectors succeed in transferring this quality of the plant to the mounted sheet. We might, perhaps, overlook this defect if the plants were, nevertheless, carefully chosen and complete. In the case of most species mature fruits are absolutely essential—as Hegelmaier insists—and the lowest leaves also, are invaluable aids to determination. Far too often, however, herbarium sheets show only sterile plants or a matted mass of plant tops—sometimes of more than one species—showing neither flowers nor fruits, and, of course, destitute of the lowest leaves. Even when fruits are present it frequently happens that they have been so heavily pressed that it is quite impossible to decide whether their lobes were divergent or convergent when growing. Three or four complete fruiting examples carefully chosen and separately displayed on one sheet are of infinitely more value than a whole gathering of tangled "tops." To ensure perfect mounted specimens it is necessary to take the plants out of the water and put them at once into a wire press. Failing this, they should be kept moist in the vasculum, later immersed in water and subsequently floated out. In either case care is essential so that the bracts and styles may be retained. Brief notes on the evidence afforded by a transverse section of the fruit, the disposition and length of the styles and the persistence (or otherwise) of the bracts would greatly add to the value of the mounted specimens.

This paper is an attempt to more clearly and fully describe the British species, with a view to stimulation of interest in their collection and ultimately to lead to a revision of their published records of distribution. I am indebted to the authorities of the British Museum, the Royal Botanic Gardens at Kew, the Manchester Museum, and Yardley Lodge, Oxford, for the examination of their herbarium specimens, for literary references and valuable suggestion.

KEY TO BRITISH SPECIES.

A. All leaves similar in shape.

1. *Broadly obovate and large*: lower leaves not linear but smaller examples of the upper leaves. Fruits large. Largest leaves 5-7 veined 6
2. *All leaves linear* 7

B. All leaves *not* similar in shape.

3. Upper leaves *broadly* obovate, but lower leaves linear and fruits with parallel lobes .... var. *platycarpa* Kütz.
4. Upper leaves *narrowly* obovate. *Most leaves of this shape* but lower become narrower and longer. A few of the lowest may be linear or sub-linear. Fruits small (1 mm.) 9
5. Upper leaves *narrow, spathulate* and *few* in number. *Most of the leaves are linear* 10
6. Fruits with the *4 free edges winged* .... *C. stagnalis* Scop.
Fruits with the 4 free edges *bluntly rounded*, but *not winged* *C. obtusangula* Le Gall.
7. As seen from above, the *4 lobes of the fruit are in 2 parallel pairs*: leaves long, very narrow, slender, yellowish-green in colour, with pincer-shaped apex. (cf. Some running water forms of *C. polymorpha*) ... *C. intermedia*, var. *homoiophylla* G. & G.

As seen from above, the 4 *lobes of the fruit are diverging and easily separable* : leaves dark green, relatively shorter and broader, apex ± truncate, emarginate 8

8. Plant *fruits freely* : *fruits large, conspicuous, numerous.* Leaves distinctly tapering above. Stems straw-coloured. Northern lakes, frequent .... *C. autumnalis* L. em. Wahl.

Plant *rarely fruiting* in Britain : *fruits very small, few* or *none.* Leaves not distinctly tapering above. Stems reddish. Pools in southern counties and Channel Isles .... *C. truncata*, var. *occidentalis* (Rouy).

9. Fruit obovate, longer than broad and *narrowed in the lower half. Styles erect, short* (1-2 mm.) and *deciduous* ... *C. verna* L. em. Lönnr.

Fruit round, broader than long. *Styles long* (4-6 mm), *persistent* and *reflexed* .... *C. polymorpha* Lönnr.

10. Upper rosette of narrow spathulate leaves inconspicuous or absent. Most of the leaves very narrow linear with a wider pincer-shaped apex. As seen from above, the 4 lobes of the fruit are in 2 parallel pairs .... *C. intermedia* Hoffm.

After using this Key the plant must be carefully checked with the appropriate description in the following list.

1. C. VERNA L. em. Lönnr.

It is not certain to what plant Linnaeus intended to apply the name *C. verna.* His meagre diagnosis is "*foliis superioribus ovalibus, floribus androgynis,*" which is so vague that it might equally apply to several species. The first British author to use this specific name in a more restricted sense seems to be Withering (*Bot. Arrang. Veg. Brit.*, 1776, 2). His description of it is "Upper leaves oval; the chive and pointals in separate flowers. Stems feeble, numerous. Blossoms small, white. Upper leaves growing near together in form of a star. Lower leaves in pairs." However, his subsequent statement that "it sometimes grows so thickly matted together as to allow one to walk upon it without sinking" cannot possibly apply to our restricted plant. Much later (1855) in Hooker & Arnott's *British Flora*, p. 381, the description of *C. verna*, and the references cited, make it quite clear that *C. stagnalis* is the plant intended.

As a result of this ambiguity all old records of *C. verna* are extremely doubtful. In many cases they probably referred either to *C. stagnalis* or to *C. intermedia.* The adoption of the name *C. verna* L. in a restricted sense began with Kützing (in *Linnæa*, vii, 1832, and Reichb. *Icon. Bot. Cent.*, ix, 1831, tab. 881). However, after the publication in 1854 of Lönnroth's paper, Kützing erred in including the new species *C. polymorpha* Lönnr. under *C. verna* Kütz. (see Fries in *Botaniska Notiser*, 1858, 132). Lönnroth's emendation of *C. verna* Kütz. is given herewith under *C. polymorpha.* It has been adopted by Glück (1924), Beger (1924) and Samuelsson (1925). The published records of the distribution of *C. verna* need complete revision. In the *Comital Flora* 38 vice-counties are given, but we agree with Dr Druce that "the identification of many of the above is doubtful and its earliest record uncertain." The *Lond. Cat.* gives 31 as the number of vice-comital records, but many of these, too, are doubtful. Twenty years ago the late Mr Arth. Bennett made an attempt to verify the published records of this species but found that in the majority of cases he was unable to do so. Among the records was one for Low Water (1786 ft.) on the shoulder of Coniston Old Man, N. Lancs. I dredged this tarn in 1913 but found the dominant species to be *C. intermedia*, with some *C. stagnalis* in the shallower margins. Subsequent examination of other mountain tarns in the Lake District yielded negative results and confirmed our opinion that the species is relatively rare or possibly overlooked.

C. verna L. em. Lönnr. Upper leaves oblong, narrowly spathulate; smaller, narrower and more gradually tapering below than in *C. stagnalis*. The leaves become narrower and longer the lower they are situated and the lowest are linear or sub-linear and 1-veined. Fruits *small*—Hegelmaier states that this species has the smallest fruits among European species—obovate, nearly black when ripe, 1 mm. long, slightly longer than broad and *perceptibly narrowed from the middle to the base* (in front view). Good figures of the fruit are those of Hegelmaier (*Monogr. Gattung Callitriche*, Stuttgart, 1864, Taf. iii, fig. 10); Lindman (*Svensk Fanerogamflora*, Stockholm, 1918, 404, fig. 2); and Samuelsson (*Der Callitriche Arten der Sweiz*, 1925, 609, fig. 1e). When mature the keels are acute and in side view the lobes are not quite parallel (as in *C. intermedia*) but slightly converging above. The styles are *short*, always *erect-patulous*, early deciduous, or the erect base only persistent. Bracts straight or only slightly curved, deciduous.

2. C. STAGNALIS Scopoli, Fl. Carniolica, ed. 2, 251, 1772. The original description is "*folia ovata*; *flores polygami*; *fructus tetragonus*," but Kützing in Reichb. *Ic. Plant. Crit. cent.*, ix, 36-38, figg. 1184-1186 (1831), more fully describes the plant:—"*Bracteolis persistentibus, medio incrassatis acutiusculis conniventibus*; *filamentis bracteolas multoties excedentibus*; *stylis persistentibus, post anthesin extrorsum arcuatis*; *fructibus* (*maximis*) *parum longioribus quam latioribus, carpellis extus cartilagineo-alatis, marginibus acutiusculis divergentibus*; *foliis omnibus ovalibus.*"

Syme (*Eng. Bot.*, viii, 128) declares that the plant having fruits with divergent lobes does not occur in Britain. We have, however, seen fresh British specimens with fruits agreeing with Kützing's description. In herbarium examples this character is not so evident, for reasons given above, but a transverse section of a carefully selected mature fruit will frequently reveal it. It is to be regretted that both figures and descriptions sometimes exaggerate the divergence as being cruciate and cause needless confusion. Looking down on the transverse section it is obvious that the degree of divergence of the lobes depends entirely upon the extent of the swelling of the carpels near their point of union—the increasing turgidity of each pair of carpels at that point inevitably forces the wings apart. The maximum divergence therefore is only to be seen in fully mature fruits. This species is so often sterile that these are by no means easy to secure. With them, however, this species is easy to determine. In one or other of its forms it is widely distributed and probably occurs in every vice-county.

C. stagnalis. Leaves all similar in shape, light green, large (much larger than those of *C. verna* L. em. Lönnr. and with shorter shafts), rounded obovate or broadly spathulate, usually forming well-marked rosettes less regular than those of *C. obtusangula.* In deep or running water often sterile with larger leaves 5-7 nerved (Guernsey, Barton, 1912!). On mud usually very small, with somewhat narrow 3-nerved leaves or having a rounded lamina. Lower flowers usually ♀, upper perfect or ♂. Fruit *large, suborbicular* or (more often) slightly broader than long, subsessile or distinctly stalked (Striber's Moss, N. Lancs!). Keels of each pair of lobes slightly but appreciably divergent. When mature, conspicuously winged on each of the four free edges now at their maximum divergence, the furrows between them wide and deep. Styles (3 mm.) erect in flower, arcuate-recurved to the fruit, persistent. Bracts falcate and persisting.

Var. *platycarpa* (Kütz.). This differs from the preceding in having its lower leaves linear and the lobes of its equally large fruits sub-parallel —"*fructibus* (*magnis*) *orbicularibus, carpellis marginatis, marginibus cartilagineis crassiusculis obtusiusculis subdivergentibus*; *foliis ramulorum junioribus* (*caulinorumque inferioribus*) *linearibus.*" The *Lond. Cat.* does not include this variety, but as the name is still found in many British floras and occurs upon numerous herbarium labels we have briefly indicated the distinctive characters of the plant and its provisional status.

Var. *serpyllifolia* Lönnroth, *Obs. Crit. pl. Suec.*. 16, 1854. This is normally a very small subterrestrial form creeping on mud or on ground over which water has long stood. Its axils bear fascicles of small narrower thyme-like leaves, 3-veined, or broader and having a rounded lamina.

3. C. INTERMEDIA Hoffmann, Fl. Germ., 2, 1791. (*C. hamulata* Kütz.).

This species is widely distributed in lowland ponds and slow streams but is seen as its best in large bodies of still water—reservoirs, mountain tarns, and lakes. It is the dominant species in such situations among the mountains of Wales, the Lake District, and Scotland, ascending to 2910 ft. on Carnedd Llewelyn and 3250 ft. on Ben Lawers.

Hoffmann's original description is brief and indefinite—"*foliis superioribus ovatibus, caulinis linearibus apice bifidis.*" The following description has been drawn up after long experience of fresh material from many vice-counties and the examination of all available herbarium examples.

C. intermedia. Upper leaves narrowly spathulate forming a weak rosette, changing gradually into the lowest which are linear with an emarginate apex often swollen like the end of a bicycle spanner. Very frequently all the leaves are narrowly linear. Lower and median flowers usually ♀ and upper ♂. The bracts to these are insensibly attenuate, falcate and caducous, falling off so early that some authors have described the flowers as being without bracts. Fruits usually sub-orbicular, sometimes rather broader than long, the L/B often nearly or quite 3:4. When described as having "almost straight sides," the end view is intended, the lobes being parallel and the blunt keels almost straight. The styles are of medium length, reflexed close to the fruit, and soon falling. Fruits much smaller than in 2, slightly larger than in 1.

Var. *homoiophylla* Grenier & Godron, *Fl. Fr.*, i, 591, 1848. Leaves all alike, slender, delicate, linear and often extremely narrow, 2 or more cm. long and 0.5 mm. wide, markedly pincer-like at the apex. This is the *C. angustifolia* Hoppe in *Bot. Taschenb.*, 160, 1792. Koch refers this to *C. hamulata* Kütz.—as do most modern authors—but Beck, Rouy and Vollmann put it under *C. verna*. Godron (*Fl. Lorraine*, i, 244) gives the name *C. autumnalis* Godron to these plants. Some herbarium specimens have been labelled *C. angustifolia* Hoppe, var. *tenuifolia* (Persoon). *C. tenuifolia* Persoon (*Synopsis Plantarum*, i, 6, 1805) is thus described "*foliis omnibus linearibus apice integris acutis, fructu 4-gono.*" So far we have seen no British examples having the leaf-apex entire and acute.

Var. *pedunculata* DC., *Fl. Fr.*, iv, 415, 1805. This is similar to the type but its lower fruits are ± longly pedunculate. The original description gives the upper leaves as oblong the lower as linear, all obtuse and not hollowed out at the apex. Fruit pedicels elongating after flowering, the upper fruits being almost sessile but the lower having stalks up to 1 cm. long. This variety occurs in a few vice-counties and is interesting as forming its fruits in early summer. All herbarium specimens labelled *C. verna* L., var. *pedunculata* Hooker, or old records of the same, belong to *C. intermedia* Hoffm., var. *pedunculata* DC., but there are also specimens labelled "*C. pedunculata* Auct. Ang. plur. & Syme, *E.B.*, v, 8, t. 1274 (non DC.)." These belong to *C. truncata* Guss. See later, under that species, and also under *C. autumnalis* L. em. Wahl.

4. C. OBTUSANGULA Le Gall., *Fl. Morbihan*, 202, 1852.

This species bears a superficial resemblance to *C. stagnalis* and possibly on that account is often overlooked. It is, however, much less frequent but occurs locally in ponds, ditches, fen dykes and lakes in England, becoming rare in the North and in Scotland. It is one of the most distinctive species of the genus and when in fruit should not be mistaken for any other species. When no fruits are present it cannot be separated from *C. stagnalis* by its leaf-nervation alone—as is sometimes supposed—as both species may have their uppermost leaves 3-, 5-, or 7-nerved. All leaves are obovate-spathulate, patent, obtuse or slightly retuse, ± attenuate into the petiole. The uppermost usually form large well-marked rosettes more symmetrical and paler than in *C. stagnalis*. The lower leaves are more remote, narrower and more translucent than the upper. The lowest leaves may be ligulate. The fruit is large (1.5-2.0 mm. long), suborbicular, slightly longer than broad (c. 9:8) with parallel lobes *not winged but having very blunt rounded edges, the furrows between them barely discernible* (in *stagnalis* these are wide and deep). The styles are slightly longer than in that species and, moreover, are *erect or spreading*, and *persistent*. The bracts are falcate and persistent.

Var. *Lachii* (Warren) of the *Lond. Cat.* is apparently a hybrid between *C. obtusangula* and *C. intermedia*. It possesses a rosette of narrower leaves similar in shape to those of *C. obtusangula* but the lower leaves are narrowly linear with truncate emarginate tips as in *C. intermedia*.

5. C. AUTUMNALIS L. em. Wahl., Fl. Suecica, ed. ii, 2 (October 1755), em. Wahlenb., Fl. Lapp. (1812). *Stellaria foliis omnibus angustis, apice resecta* Haller, Enum. Meth. Stirp. Helvet., 158 (1742). *C. hermaphroditica* Justenius, Cent. Plant., n. 89 (February 1755)—"*foliis omnibus linearibus, apice bifidis.*"

This is a plant of lakes in Northern England and Scotland, but it has been much confused with *C. intermedia* and sometimes with *C. truncata*. The name *autumnalis* has been used for the following other species:—*C. autumnalis* Hooker (in *E.B. Supp.*, 2606) is *C. truncata* Gussone: *C. autumnalis* Godr. (*Fl. Lorr.*, i, 244) is *C. intermedia*, var. *homoiophylla* Gr. & Godr. *C. autumnalis* Kützing in Rchb. *Icon. Cent.*, ix (1831) and *Linnaea*, vii (1832) is *C. intermedia*. In England the true *C. autumnalis* L., em. Wahl., has not been found south of Lat. 53° N. All records for vice-counties south of this line refer to one or other of the species given above—in most cases to *C. intermedia*. The plant is partial to peaty water and ascends to 1250 ft. at Malham Tarn, Yorkshire, and to over 1400 ft. in Perthshire. The whole plant is of a light green colour, drying olive or nearly black. It is entirely submerged and possesses no floating rosette of leaves. All leaves are alike in shape, linear-lanceolate, widest at the base and slightly but distinctly tapering in the upper half to an emarginate apex. Uppermost and lowest leaves shorter than the intermediate which are mostly over 1 cm. in length (12-18 mm.). The plant fruits more freely than any other British species, the olive fruits being large (2 × 2 mm.) and conspicuous, of 4 easily separable lobes broadly and acutely winged. There are no bracts and the styles are long, spreading or reflexed, and caducous. The considerable divergence in the descriptions of this species is mainly due to their being based upon fresh or dried material—the latter being much darker in colour. The stems of fresh plants are usually straw-coloured.

6. C. POLYMORPHA Lönnroth, "Observationes criticae plantas suecicas illustrantes," Upsala, May 1854, and later in Botaniska Notiser, 1867.

This species has a wide European distribution, being frequent or common in Sweden—from Skane to Lapland—and less so in Norway.

It is found also in most of the countries of Middle Europe, *e.g.*, Switzerland, Germany, Bohemia, Transsylvania, and Bosnia. Its occurrence in Britain has been definitely authenticated but some of its records for this country are open to considerable doubt. In attempting any revision of its British distribution we are met at the outset by the fact that there are in our herbaria very few authentic continental examples of this species and in our floras we find the same scarcity of adequate descriptions upon which to base an opinion. The species is not mentioned in Hooker's *Students' Flora* nor in Bentham and Hooker. Babington gives a brief description which is in several respects faulty and Salmon (*Fl. Surrey*, 322) has written a somewhat fuller account, but it, also, is in some particulars unsatisfactory. In view of the foregoing facts it will be agreed that if we are to obtain reliable data it will be advisable to disregard either British examples of this species or descriptions and figures based upon them and confine our attention to those of Scandinavia and other Continental countries where the species is common and well known.

The fullest and most reliable account of the history, characters, and distribution of this species is contained in Festschrift Carl Schröter " Die Callitriche—Arten der Schweiz " by Prof. Gunnar Samuelsson, the eminent Swedish authority on aquatic plants; Zurich, 1925, pp. 603-628. I am very greatly indebted to him and to Dr Johannes Lid, of the University of Oslo, Norway, for recent excellent authentic examples of this species and *C. verna*. It is clear that not without reason was this species named *C. polymorpha* for one of its most prominent characters is the diversity in the shapes of its leaves. Judging mainly by these, different forms of *C. polymorpha* might easily be mistaken for *C. verna*, *C. stagnalis*, or *C. intermedia* respectively. Moreover, fully submerged forms of *C. polymorpha* are sterile and for that reason (at least in herbaria) indeterminable. As a result herbarium examples afford abundant evidence of wrongful or doubtful determination of these species.

C. polymorpha occupies to a certain extent an intermediate position between *C. stagnalis* and *C. verna*, and the majority of European authors from Kützing (1831) to Hegelmaier (1864) have included it under one or other of these two species. Some later writers have conceived of *C. polymorpha* as being of hybrid origin—*e.g.*, F. N. Williams (*Prodromus Fl. Brit.*, ix, 515, 1912) suggests *C. platycarpa* × *intermedia*. Lönnroth's paper (cited above) is almost unknown outside Scandinavia but we give herewith his descriptions of *C. polymorpha* and *C. verna* Kütz.

C. polymorpha n. sp., *foliis caulinis et rameis infimis linearibus, uninerviis, apice emarginatis, supremis spathulatis l. oblongis, bracteis et stylis persisentibus, his ante anthesin incurvato-patulis, in anthesi divergentibus, ad fructus latera planiora vergentes, fructibus rotundis, convexis, marginibus binis approximatis, parallelis, obtusis, vix alatis. C. verna* Kütz., *foliis caulinis et rameis infimis linearibus, univerviis,* *apice truncatis vel subretusis, summis rotundis petiolatisque—sublinearibus, stylis fugacibus, erecto-patulis, fructus subovatis, convexis, marginibus binis adpresso-approximatis, parallelis, obtusis, tenuissime subalatis.*

These descriptions are of great value from their exactness and completeness but especially from the fact that in their application to fresh or herbarium specimens they are found to be singularly reliable. I have ventured somewhat to expand them and tabulate their differences in the following.

TABLE I.

	C. polymorpha.	*C. verna* (sens. str.).
Lower ls.	Apex *emarginate* — usually swollen and spanner-shaped.	*Truncate* or *sub-retuse*—usually narrowed and slightly notched.
Upper ls.	*Spathulate*, linear, or oblong.	*Rounded* (more suddenly petiolate) to sub-linear.
Styles.	*Persistent and longer*, 4-6 mm., finally strongly divergent.	*Fugacious and shorter*, 1-2 mm., erect-patulous.
Fruit.	*Roundish*, slightly *broader than long*. Lighter in colour.	*Obovate*, slightly narrowed below, *longer than broad*. Much darker in colour.
Bracts.	More *persistent*, spreading-falcate.	*Deciduous*.
Anthers.	Larger.	Smaller.

C. polymorpha is distinguished from *C. platycarpa* by its much smaller, not or very feebly winged fruits. From a prolonged study of the various species of the genus Callitriche, both in the field and from herbarium examples, the following facts emerge. Probably the commonest form of *C. polymorpha* has the majority of the leaves *narrowly spathulate* and *very gradually tapering below*; another form has a few of the uppermost weakly rosulate leaves possessing a small oval lamina and rather short petiole, the lower leaves being linear or sublinear; occasionally we meet with a form having the upper leaves all linear and pincer-shaped at the apex (as in *C. intermedia*), the lower leaves very *small and short* but much *swollen in the middle, boat-shaped*, and wider than the upper leaves—a reversal of the normal width-gradation in this genus. In none of the forms is the lamina of the uppermost leaves as wide as in those of *C. stagnalis*, and, moreover, a well-marked rosette is rarely seen. Sub-terrestrial (mud) forms are much more rare in *C. polymorpha* than in either *C. stagnalis* or *C. verna*, and have all leaves narrowly linear, of uniform width and one-nerved. Compared with most of the species with which we are more familiar the leaves are of thinner texture and paler colour.

The fruits of *C. polymorpha* are its most reliable diagnostic character and quite distinct from those of other species. They are *roundish, rather broader than long*, 1.25-1.5 mm. broad, and as a result of this slightly greater breadth have more turgid lateral margins than usual. This feature is of the greatest value in comparing the fruits of this species with those of *C. verna*, which are *longer than broad*, slightly *smaller*, and quite obviously *narrower and obovate*. The styles are persistent, 4-6 mm. long, incurved-patulous at first, finally much divergent but with the basal part still erect. Those of *C. verna* are fugacious and short (1-2 mm.) but erect. The fruits of *C. intermedia* are most often of the same size as those of *C. polymorpha* but isodiametric, and their styles differ from those of most other species in having the *basal part reflexed close to the fruit.* The styles of most species are so slender, and brittle when dried, that they are frequently broken off. It is therefore imperative to examine all the styles of a plant before forming an estimate of their length and position. In my judgment the length of those of *C. polymorpha* has been over-emphasised by some British writers. The bracts of this species are much more persistent than those of *C. verna*, which are early deciduous.

7. C. TRUNCATA Guss., Plant. rar. Ion. Adriat. coll., p. 4, t. 2, f. 2 (1826). Boiss. Fl. Orient., ii, 756. Gussone's original description is "*Caules setacei, tenuissimi, omnino pellucidi, ad genicula radicantes. Folia sessilia, apice truncata vel bidentata, pellucida, integerrima, glaberrima. Fructus et pedunculi ut præcedente (pedunculo vix semi-lineam longo, erecto instructi, læves, glabri) et magis globosi ac marginati.*"

This rare British species has only been recorded for N. and S. Somerset, W. Sussex, W. Kent, W. Gloster, Notts, Guernsey, and Wexford. It was first found by W. Borrer, 6th June 1826, "completely under water in a deep ditch between Amberley Castle and Wild Brooks" in Sussex and the specimens are in Sowerby's Hbm. at the British Museum. They were subsequently described by W. J. Hooker in *Engl. Bot. Suppl.*, t. 2606, under the name *C. autumnalis*. Long afterwards they were sent by Trimen to Dr Hegelmaier and were determined by him as *C. truncata* Gussone. They had previously been wrongly determined also by W. Arnott as *C. pedunculata*. The label reads "*C. pedunculata* Auct. Ang. plur. & Syme E.B., v, 8, t. 1274 (non DC.)." See also *Journ. Bot.*, 1870, 154. These plants are very small and some of the fruits shortly stalked. There are also in herb. Borrer at Kew plants collected by G. E. Smith (1837) in a brook between Brasted and Westerham, Kent, determined as *C. truncata* by W. H. Beeby and confirmed by Jas. Groves. In *Herb. Syme* there is a specimen from Gloucestershire. In *Herb. Musei Britannici* are Marshall's specimens from Chard Reservoir, S. Somerset, v.-c. 5 (16/9/1907). See also *Journ. Bot.*, 1908, 255. Also from S. Somerset are specimens in my own herbarium from the Bridgewater and Taunton Canal at Charlton, 30th August 1931, Miss E. Vachell. The late Mr A. Bennett had seen the species from two Nottinghamshire localities and in *Herb. Druce* there are many examples collected from the Channel Islands by Augustine Ley, W. C. Barton, and Dr Druce personally. The Irish plants from Co. Wexford (1897, E.S.M.) may be seen in *Herb. Mus. Brit.*

Rouy (*Fl. Fr.*, xii, 186) gives a description of *C. truncata* Guss. which is short but very accurate—the translation and italics are my own.

"Plant slender, all leaves *linear, insensibly attenuate from base to summit.* Styles very long (as in *C. autumnalis*), spreading-reflexed, caducous. Fruits large, broadly ovoid, *the lower* (*at least*) *longly pedicellate.* Lobes rounded on the back but completely destitute of a keel (one or more lobes often abortive)." This species is quite distinct from *C. autumnalis* L. with which it has been confused even from the first. In Britain much of this is due to Babington's italicised separation of *C. autumnalis* and *C. truncta* from the other species on account of both having linear leaves "enlarged at the base." This basal enlargement is quite obvious in *C. autumnalis* but absent or imperceptible in *C. truncata*, the leaves of which are practically parallel-sided. Hegelmaier describes the leaves of *C. autumnalis* as *lanceolate* and those of *C. truncata* as *linear*. Throughout this paper the term linear implies "practically parallel-sided for the greater part of the length," and I have emphasised this point in the case of *C. truncata* because so many of its examples in this country are sterile that any diagnostic leaf-difference is of the greatest value in the determination of species.

The entire plant is very slender with a thread-like reddish stem and leaves all similar, wider and shorter than those of *C. autumnalis* and darker green in colour. The apex is truncate and feebly emarginate. In this country the plant rarely produces fruits but when found they are small with blunt easily separable lobes, and usually subsessile.

The styles are about as long as those of *C. autumnalis*, but rarely seen, being early caducous. Up to the present the typical form of this species (which has the lower fruits longly pedicellate) has not been seen in this country. All the plants of the British Isles, the Channel Isles, and Western France belong to the following variety.

C. truncata Guss., var. *occidentalis* (Rouy) Dr. It differs from the type in being of more robust habit, more leafy, more often sterile and having fewer fruits, subsessile or only slightly stalked. In the type the fruits have pedicels 2-4 mm. long and in specimens from Sicily I have measured them up to 9 mm. in length.

As an aid to the separation of the last two species, their chief differences are here set out.

TABLE II.

	C. autumnalis L.	*C. truncata*, var. *occidentalis.*
Distr.	A plant of lakes in Northern England and Scotland. *North* of 53° N. *Lat.*	A plant of pools and ditches in Southern England. *South* of 53° N. Lat.
Fruit.	*Fruits very freely*, normally *many large fruits* (2 mm.).	*Fruits very rarely*—more often sterile —*few and small* (*1 mm.*) *fruits, if any.*
Ls.	*Longer—most over 1 cm. long. Linear-lanceolate* — widest at base, *distinctly tapering* in upper half.	*Shorter—none over 1 cm. Linear—practically parallel-sided, imperceptibly tapering* above.
Apex.	Most often emarginate and not truncate.	Truncate and less deeply emarginate.
Stem.	*Yellowish : straw-coloured.*	*Reddish.*

NOTES UPON *CALTHA PALUSTRIS* L.

G. F. Scott Elliot, M.A., B.Sc., F.R.G.S.

(Reprinted from the *Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society*—7th December 1928.)

The Marsh Marigold (otherwise Horse Blob, Water Dragon, or King Cup) is exceedingly common in Great Britain. It has even been recorded at 3400 feet altitude in the Highlands. It is, however, rather rare in chalk or limestone districts. But even in the streamless dales of Yorkshire and Derbyshire it may be found at spring heads and along such burns as do exist (1). It almost always occurs in wet mud, on gravel kept moist by rivers and streams, or in wet, rather marshy meadows.

Caltha palustris has an enormous range. It may be found almost anywhere in Europe from Norway to Spain and Italy. It is, however, rare or absent in Southern Spain and in the Midi of France. An interesting point is that it ranges right round the North Pole from Norway through Siberia, Kamschatka and Alaska to Labrador. It does not occur in West Greenland. The southward limit is not so easily defined, but it is recorded for the Caucasus, Taurus, Himalayas, Iowa, S.E. Pennsylvania, So. Carolina, Newfoundland, etc. In America it is found chiefly on the outskirts of the Prairie Swamp Forests and in wet copses.

In April and May its multitudes of golden yellow flowers are quite conspicuous in the bare or thinly occupied marshland amongst immature herbaceous stems, leaves of Rushes, Meadowsweet, etc. In June or July the fruits and mature leaves are not so easily seen, for by this time the regular meadow association is in full development.* Later in the year its flowers would have no chance in the serried ranks of the meadow grasses; it is only by flowering so early in the season that it has its opportunity.

The flowers are variable. In this country they are of quite a respectable size (3 to 4 centimetres in diameter); in Nova Zembla they are only one centimetre across. The sepals are usually five in number, stamens 70 to 80, carpels from 3 to 13 or more. Nectar is secreted by the bases of the carpels where they touch one another. The stamens mature from the outside inwards and bend towards the centre of the

*E.g., *Juncus communis*, *Iris Pseudacorus*, *Senecio aquaticus*, *Spiræa Ulmaria*, *Lychnis Flos-cuculi*, *Valeriana officinalis*, *Stachys palustris*, *Ranunculus Flammula*, *Angelica sylvestris*; in wetter places *Glyceria aquatica*, *Veronica Beccabunga*, *Myosotis palustris*, *Polygonum Hydropiper*. Less conspicuous are *Galium palustre*, *Hydrocotyle*, *Juncus bufonius*, *Montia fontana*, and *Epilobium tetragonum*. These are but a few of its regular companions or, strictly speaking, successors in Galloway.

flower so that a passing insect is well dusted with pollen. The stigmas of the carpels form at first a little cushion in the middle of the flower, but later the carpels diverge widely; they are not united together.

Insects probing for nectar must get well dusted with pollen and leave it on the stigmas of the next flower visited. Numerous insects, possibly all those which are abroad in May, have been recorded for the Marsh Marigold.

CALTHA PALUSTRIS—INSECT VISITORS (2).

	Germany.	Flanders.	Dumfriesshire and Galloway.	Yorkshire.
Hive Bee,................	+	+	+	+
Bombus	+	—	+	—
Smaller bees	2 species*	—	1 species	—
Hover flies and larger sucking flies.........	5 species †	3 species	2 species	—
Small flies	+	—	+	—
Beetles	+	—	+	—

* *Andrena, Osmia.*

† *Empis, Melanostoma, Eristalis. Rhingia, &c.*

The Ranunculaceae to which *Caltha* belongs is one of the most primitive of all the natural orders. In all orders, except those few which are considered archaic or primitive, sepals, petals, stamens and carpels are arranged in circles. The number in each circle is usually fixed and definite.

The Marsh Marigold has only one circle of bright yellow sepals; these also act as petals attracting insects to the flowers, but they play the regular part of sepals in that they cover stamens and carpels in the bud.

The number of sepals, however, is *not* fixed; there may be four, five, six, or more. If one could discover why some have many and others only a few sepals, then there might be a clue to the reasons which have induced almost all flowering plants to fix upon three, four or five sepals as the most suitable number to have.

The sepals of *Caltha palustris* have been counted by many observers in different countries and at varying times of the year; some of the results are given in the table.

CALTHA PALUSTRIS.

			Percentages of flowers with sepals numbering					
			4	5	6	7	8	9
(3)	Sweden :	Gathered 3-28 May	0·7	92.7	5.4	0.8	0.1	0.05
	,,	,, 1st June	0.6	84.3	12.1	2.7	0.2	
(4)	,,	,, Harjedal	3.5	94.9	1.4	0.2		
	,,	,, Bohuslan	0.2	93.5	4.7	1.7	0.2	
	,,	,, Tyskland	—	79·4	16	2.1	1.4	1.1
(5	Scotland :	Meadow, Castle-Douglas	2	95	3			
	,,	Wet meadow, Drumwhill	6	85	9			
		In ditch, in rich soil, Dunlop, Ayrshire	0.6	74.2	22.2	3		

Now, of the three places in Sweden where Falck carried out his measurements, Harjedal is in the north, Bohuslan is in Mid Sweden, and Tyskland is in the south. A first suggestion was to the effect that the farther south the place (that is the more genial the conditions) the fewer were the flowers with four sepals. This was confirmed by observations in Denmark, which showed that there only 0.5 per cent. had four sepals, as well as by others in Holland and Germany, where none had so few as four. The two series given by Gertz showed that early flowers, presumably opening in worse weather, had a higher percentage with four and a much smaller number with six. The ditch at Dunlop was chosen by myself because the plants seemed to be unusually vigorous; those near Castle-Douglas were in an open, rather exposed place where there was much competition.

The obvious explanation of all these observations is that the more favoured the locality and the more vigorous the plant the more numerous are the sepals. It would surprise no one to find that a particularly vigorous branch of a birch or other tree had more leaves than an exposed and starveling shoot. It seems quite unnecessary to assume that there are special strains of *Caltha*, some with four and others with five sepals. The simplest and most satisfying theory is that the number of sepals simply varies with the food supply and with the general vigour of the individual.

If this is so, stamens and carpels ought also to show similar variations in number. That they do so has been proved by Dr Burkill (6) who counted 11,453 stamens and 891 carpels of the Marsh Marigold. The terminal flower is usually the first to open, and is almost always the largest. His observations show distinctly that the earliest formed flowers carry the most stamens and carpels, and also that the largest branches (*i.e.*, those which produce most flowers) have in their flowers more stamens and carpels than the flowers in corresponding positions on weaker stems.*

There are two very interesting species of *Caltha* which also suggest that the number of stamens and carpels depends upon individual vigour.

One (*C. limbata* Schl.) grows in Chile at 3000 metres altitude (Maule river), and has only 8 to 10 stamens and 2 to 5 carpels. Another still hardier little plant (*C. Dionaefolia* Hook.) lives in the Straits of Magellan and about Cape Horn; this almost antarctic plant has 5 to 9 stamens and only 3 carpels.† (7)

In other plants also there is evidence that a favourable position on the stem or other advantage leads to an increase of stamens, carpels or of flowers. For instance, the common Daisy has in Germany an average of 34 ray florets; in the Isle of Wight it has 46, at Rome 55, and near Palermo 65. (8) Dr Burkill (*l.c.*) shows that this holds true in three species of Ranunculus, in Bocconia, and especially in the Chickweed (*Stellaria media*).

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*For details reference must be made to the original.

†Falck found one specimen in Sweden with five stamens and no carpels at all. In Galloway the carpels vary from four to thirteen : about one-third (31.2 per cent.) have eight carpels.

If the general rule is correct, that is if the number of sepals in *Caltha palustris* and of stamens and carpels in all flowers varies with vigour, then it is just because they cannot manage to develop beyond a certain point.

In all these flowers the first rudiments of sepals, petals, etc., appear as minute projections of embryonic tissue; first come the sepals, then petals, with stamens and carpels in the order named.

In the Cape Horn *Caltha*, which lives in a terrible climate, and probably in a state of starvation, the food supply would, let us suppose, fail after forming at most 9 stamens and 3 carpels, and so no more rudiments would appear.

After pollination there is a distinct elongation and lengthening of the flower stalk, which endeavours to keep pace with, or over-reach, the Ragged Robin and other stems which are now in full development.

The carpels also enlarge and diverge, turning outwards and downwards. They are very like small pea pods, and may be 2 cm. long and 5 mm. broad.

In consequence of this quick growth, which is especially marked in wet weather, a state of strain is developed along the upper edge of the carpels, which is, of course, the seam formed by the united edges of the carpel.

If at this time one touches the tip of a plump strained-looking pod it bursts and most of the seeds are thrown out. In one case the carpel was 4 cm. above the mud and the seeds were scattered to 20 cm. distance.*

The seeds themselves are about 3.5 mm. long, of which about 1 mm. is due to a spongy air-filled cap, which is the enlarged raphe of the ovule. The characteristic sponginess of water plants is here employed to make the seeds buoyant. They do, in fact, float for from one to four weeks, or even longer, so that in floods or wet weather they may be carried for quite a long way down a river.

When ripe the seed itself is brown, shining and hard; the shell contains astringent tannin which protects the embryo during its voyages (10); the shape is rather like that of a bomb; the contours (except the fleshy annex) are streamlines. All these points are obviously advantages in navigation.

The surface of the seeds becomes distinctly sticky after they have been a little time in water. I lifted a few seeds out of the water with a feather, which was then hung up above the table; twenty-four hours afterwards most of the seeds were still sticking to it.

Thus the Marsh Marigold has three distinct methods of distributing its seeds; the elastic splitting of the carpel is due to the ordinary natural result of growth and of the drying up of the tissues; buoyancy

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*Some authorities say that the opening of the carpels only takes place in wet weather as in *Veronica Beccabunga* and *V. Anagallis*.

is just a slight development of the sponginess of water plants in general; the sticky secretion of the seed coat is probably a mucilaginous degeneration of the cellwall-substance in contact with water, yet this slight change would keep the seeds entangled in a wild duck's plumage even for a very long flight.

None of these modifications are in any way unusual, but they are obviously advantageous. In the Arctic regions, where *Caltha* decorates the flat, undulating and most desolate tundra, running water is probably rare. Birds probably have carried its seeds all round the North Pole.

After six weeks in water most of my seeds had germinated. The embryo lies just below the hard pointed end; it is here that the seed coat splits and the tiny rootlet grows out and fixes itself in the mud by root hairs.* The tips of the seed leaves remain within the seed coat; in fact, they had considerable difficulty in getting out of it; under natural conditions it is probable that the testa and swollen raphe stick to the mud; this would greatly assist the seed leaves in becoming free.

Most authorities state that *Caltha palustris* is poisonous, and it is certainly not often eaten by grazing animals. It is, however, said that the European bison (now nearly extinct) was very fond of it. It certainly suffers severely from the ravages of snails and various insects. Neat round holes in the leaf are probably made by leafcutting bees; a minute orange grub about half a millimetre in length frequently devours the buds; possibly the mother insect introduced its eggs through a round hole which one finds in such cases between the bases of the sepals.

Some twelve or thirteen parasitic fungi have also been recorded for the Marsh Marigold. These include two Rusts and two Mildews† (11). One of the former, *Puccinia Calthae*, is common on the radical leaves in July, and has been noticed in Europe, Siberia, and North America.

There are some 26 other species of the genus. *Caltha palustris* now flourishes, as we have seen, right across the whole north temperate world. It has the widest distribution of all the species of *Caltha*. There are other species in Scotland, Transylvania, the Caucasus, Asia Minor, Persia, the Himalayas, and East Indies.

In North America there are quite a number of *Calthas* (8 or 9 species), and especially in the Rocky Mountains.

Now, when glaciers existed in the Yosemite valley there was every opportunity for the pioneer Calthas to migrate from the Rockies southwards along the Cordillera of the Andes. They certainly seem to have done so, for to-day one finds many Calthas in the Andes; there are several in Chile, and at least three in Fuegia and about the Straits of Magellan. If, as seems probable, its seeds can be carried in birds' plumage, the existence of a species in Australia and two in New Zealand is not surprising.

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*The ordinary roots have no root hairs.

†*Erysiphe polygoni, Sphaerotheca humuli.*

There are many other interesting points in the mode of life of *Caltha palustris*.

Thus an ordinary plant will have 20 roots, each of which is from 20 to 30 cm. long and 2 mm. or more in diameter. The active transpiration of such a plant, especially if growing in mud and in windy weather, will undoubtedly tend to keep the soil more or less dry.

Now, in cold, wet, temperate regions, mosses are always endeavouring to occupy wet ground. Poor pasture, or, for instance, a tennis lawn, if the grasses are unhealthy, will soon become mossy and fogged. Unless checked there is always the danger that a peat moss might form.

In that case the Ragged Robin association and meadow grasses would be suffocated and a "Lochar Moss" would develop.

You will see then that such plants as *Caltha palustris* take their place as a working unit in the maintenance of the greatest number of the very best plants in their particular station.

The Marsh Marigold has resided in Britain for many thousands of years. (Dr Reid—Origin of the British flora.)

At Mundesley, in Norfolk, its nuts were found in the Cromer Forest bed along with *Trapa natans*, as well as *Elephas meridionalis*, Hippopotami, etc., etc. These beds are reckoned as Late Pliocene, that is, before the Great Ice Age.

During warm interglacial times, that is, between the Rissian, which was the worst, and the Wurmian, which was the last Ice Age, *Caltha palustris* was living at West Withering, in Sussex. In late glacial times, during the retreat of the Wurmian ice sheet, there were deposits of peat at Hoxne, in Suffolk, and it was growing there also. There are Neolithic records of *Caltha* at Hailes, near Edinburgh, and also a Roman age record at Silchester, Hampshire.

Now, Dr Colman, in his "Ice Ages," estimates the time occupied by the Ice Age as a whole (that is, including its four great advances as well as the long mild interglacial periods), as from 600,000 to 700,000 years. The time since then, that is since the ice definitely retreated, is estimated by some authorities as 8000 years and by others as 13,000 years.

(I do not myself think that either of these figures can be considered proven.)

During all these years the Marsh Marigold has flourished in Britain!

From the early Chalk period until that of the Cromer Forest bed Europe enjoyed a warm, mild and wet climate, perhaps like that of Tennyson's Isles of Eden. There was just one interruption. During the early Eocene cold water from the Arctic Ocean penetrated southward over what is now the North Sea or German Ocean, and as far, nearly, as the Straits of Dover. The shellfish which formerly lived there became first small and starved looking, and then died out altogether. They were replaced by Arctic species.

At this time quite a considerable part of southern England and northern France was dry land. Yet the climate must have been wet and cold.

The ancestor of *Caltha* was in all probability a woody perennial shrub accustomed to a warm, humid and comfortable climate. This " cold snap " may have been responsible for the appearance of the first Marsh Marigold.

If so, it could escape the rigours of the Great Ice Age, for even in the worst phase of this devastating period England, south of the Thames valley, was not obliterated by boulder clay.

It is a tenable proposition, therefore, that the birth-time of *Caltha palustris* was the cold period of the Eocene. Ever since then it has clung to the frozen limit of vegetation and faithfully followed the wanderings of the Northern Ice.

It was this cold period of the Eocene that destroyed the domination of cold-blooded, gigantic Dragons and Reptiles, and gave the Mammals, including our ancestors, a chance to occupy and possess the earth.

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(9) Guppy, *Studies in Seeds and Fruits.*

(10) Kinderman, *Botan. Centralblatt*, Tome 128.

(11) Oudeman, *Enumeration System Fungi*; Grove, *Brit. Rust Fungi.*

COLOURED ILLUSTRATIONS OF HERTFORDSHIRE FUNGI.

The following list of Fungi collected about 1840-2 in the neighbourhood of Hitchin, Herts, by Isaac Brown—who had a school there—has recently come to light and has been supplied by the Letchworth and District Natural History and Antiquarian Society as an addendum to the papers by the late Mr J. E. Little on the "Flora of the Ivel District" published in our Reports of 1932 (375) and 1933 (637). The specimens were painted for Brown by one of his masters, Mons. A. Fillieul. The original paintings can be seen at the Letchworth Museum and they have recently been named by the authorities of the Imperial Mycological Institute, and Miss Wakefield of the Royal Botanic Gardens, Kew.

No.	Date.	Brown's Name.	Correct Name.	Locality.
1 ...	/10/42	*muscarius*	*Amanita muscaria* (L.) Fr.	Ampthill.
2 ...	20/10/42	*phalloides*	*A. phalloides* (Vaill.) Fr.	Hitch Wood.
3 ..	30/ 8/44	*asper*	*A. rubescens* (Pers.) Fr. ?	Hitch Wood.
4 ...	/10/42	*muscarius*	*Amanitopsis fulva* (Schaeff.) W. G. Sm.	Westwood : Offley Holes.
5 ...	/10/42	*vaginatus*	*A. vaginata* (Bull.) Roze.	Greenlane.
6 ...	10/11/42	*androsaceus*	*Androsaceus Androsaceus* (L.) Pat.	Lax's : St Ippolyts.
7 ...	1/12/43	*epiphyllus*	*A. epiphyllus* (Fr.) Pat.	Stevenage.
8 ...	/12/42	*Hudsoni*	*A. Hudsonii* (Pers.) Pat.	Hitch Wood.
9 ...	/10/42	*melleus*	*Armillaria melleus* (Vahl) Fr.	Everywhere.
10 ...	/10/42	*granulatus*	*Boletus granulatus* (L.) Fr	Hitchin Park.
11 ...	/10/42	*luridus*	*B. luridus* (Schaeff.) Fr.	Lax's Plantation.
12 ...	16/11/42	*variabilis*	*Claudopus variabilis* (Pers.) W. G. Sm.	Hitch Wood.
13 ...	7/11/43	*cyathiformis*	*Clitocybe cyathiformis* (Bull.) Fr.	Hitch Wood.
14 ...	28/11/42	*fragrans*	*C. fragrans* (Sow.) Fr.	Lax's Fir Plantation.
15 ...	22/ 8/44	*flaccidus*	*C. infundibuliformis* (Schaeff.) Fr.	Wain Wood : Preston.
16 ...	20/10/42	*infundibuliformis*	*C. infundibuliformis* (Schaeff.) Fr.	Hitch Wood.
17 ...	25/11/42	*nebularis*	*C. nebularis* (Batsch.) Fr.	Lax's Plantation.
18 ...	15/11/43	*nebularis*	*C. nebularis* (Batsch.) Fr.	Lax's Plantation.
19 ...	24/ 9/44	*phyllophilus*	*C. phyllophila* Fr.	Lax's Plantation.
20 ...	22/ 8/44	*prunulus*	*Clitopilus prunulus* (Scop.) Fr.	Wain Wood.
21 ...	1/11/42	*butyraceus*	*Collybia butyracea* (Bull.) Fr.	Lax's Plantation.
22 ...	10/10/42	*fusipes* (*velutipes*)	*C. fusipes* (Bull.) Berk.	Redcoat Green. St Ippolyts.
23 ...	/10/42	*fusipes*	*C. fusipes* (Bull.) Berk.	Hitchin Park.
24 ...	24/ 8/44	*radicatus*	*C. radicata* (Relh.) Berk.	Hitchin Hill.
25 ...	20/ 9/44	(not named)	*C. rancida* Fr. ?	Wain Wood.
26 ...	1/10/44	*velutipes*	*C. velutipes* (Curt.) Fr.	Hitchin.
27 ...	/10/42	*cinereus*	*Coprinus atramentarius* (Bull.) Fr	Roadsides.
28 ...	/ 9/42	*comatus*	*C. comatus* (Fl. Dan.) Fr.	Roadsides.
29 ...	20/ 4/44	*macrorhizus*	*C. macrorhizus* (Pers.) Rea	In the hot-bed, Hill Garden, Hitchin.
30 ...	/ 9/42	*micaceus*	*C. micaceus* (Bull.) Fr. ?	Roadsides.
31 ...	30/ 9/42	*niveus*	*C. niveus* (Pers.) Fr.	Hitchin Park.
32 ...	15/10/42	*plicatus*	*C. plicatilis* (Curt.) Fr.	Roadsides.
33 ...	30/11/43	*cinnamomeus*	*Cortinarius cinamomeus* (L.) Fr. ?	Offley Plantation.
34 ...	18/ 9/44	*gentilis*	*C. gentilis* (Fr.). ?	West Wood.

No.	Date.	Brown's Name.	Correct Name.	Locality.
35 ...	30/ 8/44	*collinitus*	*C.* (sp.). ?	Hitch Wood.
36 ...	/10/42	*cantharellus* *cornucopioides*	*Craterellus cornucopioides* (**L.**) **Fr.**	Woods.
37 ...	19/10/44	*mollis*	*Crepidotus mollis* (Schaeff.) **Fr.**	Small plantation on road to Willian.
38 ...	22/ 8/44	*rhodopolius*	*Entoloma rhodopolium* Fr.	Wain Wood.
39 ...	12/10/43	*glutinosus*	*Gomphidius glutinosus* (Schaeff.) **Fr.**	Pinnacle Hill Plantation, near Hitchin.
40 ...	/ 9/42	*rutilus*	*G. viscidus* (**L.**) Fr.	Hitchin Park.
41 ...	/10/42	*fastibilis*	*Hebeloma crustuliniforme* (Bull.) **Fr.** ?	Fir plantation.
42 ...	28/10/43	*collinitus*	*H.* sp. ?	Wain Wood : under bushes in a thick part.
43 ...	/10/42	*coccineus*	*Hygrophorus coccineus* (Schaeff.) Fr.	Pastures.
44 ...	/10/42	*coccineus*	*Hygrophorus coccineus* (Schaeff.) Fr.	Pastures.
45 ...	/ 9/42	*conicus*	*H. conicus* (Scop.) Fr.	Hitchin Park.
46 ...	1/12/43	*hypothejus*	*H. hypothejus* Fr.	Lax's Fir Plantation.
47 ...	/10/42	*virgineus*	*H. niveus* (Scop.) Fr.	Meadows everywhere.
48 ...	/ 9/42	*psittacinus*	*H. psittacinus* (Schaeff.) Fr.	Hitchin Park.
49 ...	/ 9/42	*psittacinus*	*H. psittacinus* (Schaeff.) Fr.	Hitchin Park.
50 ...	/10/42	*pratensis*	*H. pratensis* (Pers.) Fr.	Lax's Plantation.
51 ...	/ 9/42	*atomatus*	*Hypholoma appendiculatum* (Bull.) **Fr.**	Hitchin Park.
52 ..	/10/42	*fascicularis*	*H. fasciculare* (Huds.) Fr.	Everywhere.
53 ...	13/10/43	*stipatus*	*H. hydrophilum* (Bull.) Fr.	Hitch Wood.
54 ...	15/10/42	*lateritius*	*H. sublateritium* (Schaeff.) Fr.	Hedges near Lax's.
55 ...	/10/42	*lachrymabundus*	*H. velutinum* (Pers.) Fr.	Near Wymondley.
56 ...	/10/42	*flocculosus*	*Inocybe flocculosa* Berk.	? ?
57 ...	17/ 8/44	*rimosus*	*I. rimosa* (Bull.) Fr.	Wain Wood.
58 ...	/10/42	*laccatus*	*Laccaria laccata* (Scop.) B. & Br.	Hitch Wood.
59 ...	20/10/42	*theiogalus*	*Lactarius chrysoleus* Fr.	Hitch Wood.
60 ...	20/10/42	*cilicioides*	*L. cilicioides* Fr.	Hitch Wood.
61 ...	/10/42	*deliciosus*	*L. deliciosus* (L.) Fr.	Redcoat Green, St Ippollyts.
62 ...	18/ 9/44	*fuliginosus*	*L. fuliginosus* Fr.	West Wood.
63 ...	24/ 9/44	*quietus* ?	*L. glyciosmus* Fr. ?	Lax's Plantation.
64 ...	20/10/42	*hysginus*	*L. hysginus* **Fr.**	Hitch Wood.
65 ...	24/11/43	*subdulcis*	*L. mitissimus* Fr.	Hitch Wood.
66 ...	7/ 8/44	*piperatus*	*L. piperatus* (Scop.) Fr.	Hitch Wood.
67 ..	17/ 8/44	*pyrogalus*	***L. pyrogalus*** (Bull.) Fr.	Wain Wood.

No.	Date.	Brown's Name.	Correct Name.	Locality.
68 ...	/10/44	*quietus*	*L. quietus* Fr.	Lax's or West Wood.
69 ...	30/ 8/44	*torminosus*	*L. torminosus* (Schaeff.) Fr.	Lax's, near the Bridge.
70 ...	13/10/43	*uvidus*	*L. uvidus* Fr.	Hitch Wood.
71 ...	22/ 8/44	*vellereus*	*L. vellereus* Fr.	Wain Wood.
72 ...	18/ 9/44	*volemus*	*L. volemus* Fr.	West Wood.
73 ...	22/ 8/44	*cochleatus*	*Lentinus cochleatus* (Pers.) Fr.	Wain Wood.
74 ...	28/ 9/44	*granulosus*	*Lepiota amianthina* (Scop.) Fr.	West Wood.
75 ...	10/10/42	*cristatus*	*L. cristata* (H. & S.) Fr.	Lax's Plantation.
76 ...	20/10/42	*granulosus*	*L. granulosa* (Batsch.) Fr.	Near Hitch Wood.
77 ...	none	*procerus*	*L. procera* (Scop.) Fr.	? ?
78 ...	/10/42	*procerus*	*L. rachodes* (Vitt.) Fr.	Redcoat Green, St Ippollyts.
79 ...	15/11/43	*excoriatus*	*L.* sp.	Lax's Plantation.
80 ...	22/ 8/44	*sericellus*	*Leptonia sericella* (Fr.) Quel.	Wain Wood.
81 ...	none	*chalybeus*	*L. serrulata* (Pers.) Fr. ?	? ?
82 ...	2/11/42	*porreus*	*Marasmius alliaceus* (Jacq.) Fr. ?	Hitch Wood.
83 ...	1/11/43	*tenacellus*	*M. conigenus* (Pers.) Karst.	Lax's Plantation.
84 ...	17/11/42	*conigenus*	*M. conigenus* (Pers.) Karst.	West Wood.
85 ...	20/ 9/44	*dryophilus*	*M. dryophilus* (Bull.) Karst.	Wain Wood.
86 ...	15/11/43	*esculentus*	*M. esculentus* (Wulf.) Karst.	Lax's Plantation.
87 ...	30/ 9/42	*Oreades*	*M. Oreades* (Bolt.) Fr.	Hitchin Park.
88 ...	8/11/43	*personatus*	*M. personatus* (Bolt.) Fr.	Lax's Plantation.
89 ...	16/11/42	*ramealis*	*M. ramealis* (Bull.) Fr.	Hitch Wood.
90 ...	3/11/42	*alcalinus*	*Mycena alcalina* Fr.	Hitch Wood.
91 ...	/10/43	*clavus*	*M. clavus* (L.) Rea.	Mount Pleasant, Hitchin.
92 ...	1/12/42	*corticola*	*M. corticola* (Schum.) Fr.	Hitchin Park and Garden.
93 ...	18/ 9/44 and 23/11/43	*epipterygius*	*M. epipterygia* (Scop.) Fr.	Trunks Wood, St Ippollyts.
94 ...	3/11/42 and 10/11/42	*galericulatus*	*M. galericulata* (Scop.) Fr.	Hitch Wood and Lax's.
95 ...	10/10/44	*galopus*	*M. galopus* (Pers.) Fr., var. *nigra* Fl. Dan.	Hitch Wood.
96 ...	8/11/43	*lacteus*	*M. lactea* (Pers.) Fr.	Hitch Wood.
97 ...	/10/42	*polygrammus*	*M. polygramma* (Bull.) Fr.	Shady places.

No.	Date.	Brown's Name.	Correct Name.	Locality.
98 ...	8/11/43	*purus*	*M. pura* (Pers.) Fr.	Lax's Plantation.
99 ...	12/11/42	*strobilinus*	*M. sanguinolenta* (A. & S.) **Fr.**	Wain Wood.
100 ...	17/11/42	*stylobates*	*M. stylobates* (Pers.) Fr.	West Wood.
101 ...	9/12/42	*lenerrimus*	*M. lenerrima* Berk.	Own garden.
102 ...	13/10/43	*pascuus*	*Nolanea pascua* (Pers.) Fr.	Lane, Chapel Foot, Hitchin.
103 ...	7/ 8/44	*parasiticus*	*Nyctalis parasilica* (Bull.) **Fr.**	Hitch Wood.
104 ...	7/11/43	*camptophyllus*	*Omphalia camptophylla* **Berk.**	Hitch Wood.
105 ...	9/ 9/44	*fibula*	*O. fibula* (Bull.) Fr.	West Wood.
	/10/43	*fibula*, var. *Swartzii*	*O. fibula* (Bull.) Fr., var. *Swartzii.*	Mount Pleasant, Hitchin.
106 ...	22/12/43	*umbelliferus*	*O. umbellifera* (L.) Fr.	Bank of the road, S.E. corner of Hitch Wood.
107 ...	none	none	*Paneolus papilionaceus* (Bull.) **Fr. ?**	? ?
108 ...	12/11/42	*stypticus*	*Panus stypticus* (Bull.) Fr.	Wain Wood.
109 ...	/ 9/42	*giganteus*	*Paxillus giganteus* (Sow.) Fr.	West Wood.
110 ...	/10/42	*involutus*	*P. involutus* (Batsch.) Fr.	J. Lucas' Plantation.
111 ...	/ 9/42	*aureus*	*Pholiota aurea* (Mattusch) **Fr.**	Near Redcoat Green, St Ippollyts.
112 ...	29/10/42	*mutabilis*	*P. marginata* (Batsch.) Fr.	Fir plantation on right hand going to Offley.
113 ...	13/10/43	*praecox*	*P. praecox* (Pers.) Fr.	Roadside beyond the Greyhound, London Rd.
114 ...	13/10/43	*Agaricus praecox*	*P. praecox* (Pers.) Fr.	Roadside beyond the Greyhound, London Rd.
115 ...	none	*praecox*	*P. praecox* (Pers.) Fr. ?	? ?
116 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) Fr.	Hitchin Park.
117 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) Fr.	Hitchin Park.
118 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) Fr.	Hitchin Park.
119 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) Fr.	Hitchin Park.
120 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) Fr.	Hitchin Park.
121 ...	10/10/42	*Agaricus squarrosus*	*P. squarrosa* (Müll.) **Fr.**	Hitchin Park.
122 ...	30/ 8/44	*Pluteus*	*Pluteus cervinus* (Schaeff.) **Fr.**	Hitch Wood.
123 ...	22/ 8/44	*phlebophorus*	*P. phlebophorus* (Ditm.) Fr.	Wain Wood.
124 ...	none	none	*Polyporus giganteus* **Fr.**	**? ?**
125 ...	none	*A. campestris*	*Psaliota campestris* (L.) Fr.	**? ?**
126 ...	/10/42	*Georgii*	*P.* sp. ?	Hitchin Park.
127 ...	23/10/43	*bifrons*	*Psathyra* sp. ?	Grassybank, Gosmore.
128 ...	23/ 9/44	*atomatus*	*Psathyrella atomata* Fr.	Kitchen Garden.
129 ...	4/10/43	*A. atomatus*	*P. atomata* Fr.	Hedgebank, near Purwell Mill, Hitchin.
130 ...	7/10/43	*A. disseminatus*	*P. dissiminata* (Pers.) Fr.	At the lintel of the gate in the garden.

No.	Date.	Brown's Name.	Correct Name.	Locality.
131 ..	12/10/44	*gracilis*	*P. gracilis* Fr.	Bury Wood.
132 ...	17/ 8/44	*exsuccus*	*Russula chloroides* (Krombh.) Bres.	Wain Wood.
133 ...	7/ 8/44	*foetens*	*R. foetens* (Pers.) Fr.	Wain Wood and Hitch Wood.
134 ...	/10/42 and /11/42	*emeticus*	*R. fragilis* (Pers.) Fr.	Lax's Plantation and Hitch Wood.
135 ...	24/ 9/44	*alutaceus*	*R. fragilis* (Pers.) Fr. ?	Offley Plantation.
136 ...	7/ 8/44	none	*R. nigricans* Bull.	Hitch Wood.
137 ...	17/ 8/44	*nitidus*	*R. nitida* (Pers.) Fr.	Wain Wood.
138 ...	18/12/43	*albo-brunneus*	*R. ochroleuca* (Pass.) Fr.	Lane between Lady Grove and Hitch Wood.
139 ...	30/ 9/42	*aeruginosus*	*Stropharia aeruginosa* (Curt.) Fr.	Hitchin Park.
140 ...	28/ 9/44	none	*S. albocyanea* (Desm.) Fr. ?	West Wood.
141 ...	/10/42	*Agaricus semiglobatus*	*S. semiglobata* (Batsch.) Fr.	Offley.
142 ...	/10/42	*semiglobatus*	*S. semiglobata* (Batsch.) Fr.	Offley.
143 ...	8/11/43	*collinitus*	*S. squamosa* (Pers.) Fr.	Hitch Wood.
144 ...	29/10/42	*fulvus*	*Tricholoma albo-brunneum* (Pers.) Fr. ?	Fir plantation on right hand going to Offley.
145 ...	15/11/43	*columbetta*	*T. columbetta* Fr. ?	Wain Wood.
146 ..	10/10/42	*personatus*	*T. nudum* (Bull.) Fr.	Lax's Plantation.
147 ...	15/10/42	*fumosus*	*T. polioleucum* Fr. ?	Highbury, Hitchin.
148 ...	/10/42	*rutilans*	*T. rutilans* (Schaeff.) Fr.	Towards Offley.
149 ...	/10/42	*sulphureus*	*T. sulphureum* (Bull.) Fr.	Redcoat Green, St Ippollyts.

LIST OF 22 PAINTINGS THAT CANNOT BE IDENTIFIED CERTAINLY WITHOUT MICROSCOPIC EXAMINATION OF A SPECIMEN.

No.	Date.	Brown's Name.	Locality.
1 ...	7/ 8/44	*callosus*	Meadow near Hitch Wood
2 ...	14/10/43	*campanella, β badipes*	Offley Plantation.
3 ...	1/11/43	*cerasinus* or *albo-brunneus*	Lax's Plantation.
4 ...	23/10/43	*compressus*	Near Hitch Wood.
5 ...	none	*elegans*	Hitchin.
6 ...	none	*fastibilis*	None
7 ...	20/ 9/44	*fimbriatus β*	Wain Wood.
8 ...	none	*flavidus*	None
9 ...	7/ 8/44	*furfurascens*	On the ground, Lady Grove.
10 ...	/10/42	*geophyllus*	J. Lucas' Plantation.
11 ...	19/10/44	*imbricatus*	Lady Grove.
12 ...	none	*infundibuliformis*	None
13 ...	none	*infundibuliformis*	None.
14 ...	15/10/42	*melinoides*	Hitchin Park.
15 ...	/10/42	*multiformis*	Fir plantations.
16 ...	11/ 8/44	*Cantharellus agaricoides*	Hitchin Park.
17 ...	29/11/43	*tener*	Offley Holes Plantation.
18 ...	none	*stipatus* C ?	Hitchin.
19 ...	13/10/43	*semiovatus*	Hitch Wood.
20 ...	24/ 9/44	*scaber*	Offley Plantation, near the top under beeches.
21 ...	28/ 9/44	?	West Wood.
22 ...	3/ 9/44	?	Lax's Plantation.

N.B.—Brown gave no generic names except where they are given in the columns "Brown's Name."

These paintings illustrate 113 named species, 2 named varieties, 14 duplicates, 21 species of slightly doubtful identity, and 22 that cannot be named—172 in all, all from the neighbourhood of Hitchin, Herts.

LIMOSELLA SUBULATA Ives.

[=*Limosella tenuifolia* Nuttall.]

Appearance of *L. subulata* in England.

W. H. Pearsall.

[For many years competent botanists have queried the status of the *Limosella aquatica*, var. *tenuifolia* Hook. from Kenfig and I am indebted to Lady Davy for the following translation from a valuable paper by Prof. H. Glück—*Botanische Jahrbücher*, Band lxvi, Heft 5, 1934—on this genus.]

The question as to whether *L. aquatica*, var. *tenuifolia* Hook. fil., and *L. aquatica*, var. *tenuifolia* Lej., were the same plant was made the subject of a special enquiry in 1901 by Mr W. P. Hiern and the results were published in the *Journ. Bot.*, vol. 39, 1901, 336-339. From special knowledge we are of opinion that the existing material which originated from Kenfig was insufficient. In this communication W. P. Hiern has made two serious errors, of which the first is clearly the cause of the second. He accepts the authority of Sir Joseph Hooker and combines some of the *L. tenuifolia* of the Antarctic with *L. aquatica* and also with *L. aquatica*, var. *tenuifolia* Hook. fil. Yet Hooker had the proof that the Antarctic "*tenuifolia*" really was identical with the European *L. aquatica*, but he did not convey it.

From Hiern's description it is quite obvious that he had two different species before him and it is remarkable that he did not discern the difference. An unprejudiced reader becomes convinced that the figures (426c) given by Hiern do not agree throughout with his detailed descriptions. The picture of its habit on plate 426 and also the 6-times enlarged flower both fit *L. aquatica* well; but the chief description on p. 337 belongs to *Limosella subulata* Ives = *L. tenuifolia* Nuttall.

W. P. Hiern says "The limb spreading, very nearly regular, 5-partite, about 3 mm. in diameter," and the 6-times enlarged blossom shows a corolla with a diameter of 5.5 mm., but which should be 18 mm. diameter according to this enlargement! Hiern says further, "The segments of the corolla about 1 mm. long." On the 6-times enlarged blossom the corolla segments have a length of 1.5 mm. but according to this enlargement they should be 6 mm. long! Hiern also says "Style rather short, filiform, 1.5 mm. long," and in the 6-times enlarged blossom the style heightens to 1.8 mm. long, but should have by this enlargement a length of 6-9 mm.! These 2 figures represent the real *Limosella aquatica* L. There is, indeed, one form with linear leaves, which is a first-leaf form, and which is identical in reality with *Limosella aquatica* L., var. *tenuifolia*.

But an enigmatical point still remains over. In both these figures the flower is depicted as being very long, the calyx border wide, surpassing the corolla, which does not appear in either *Limosella aquatica* or *L. subulata*. These pictures can only have come through conditions that result from pressing the corolla itself out of the calyx. It is therefore certain that W. P. Hiern had in fact two quite different objects before him.

The simplest solution of these riddles is this, that one assumes that the examination material that Hiern had before him from the Kenfig Pool in Wales must have embraced two different objects, one of *Limosella aquatica*, var. *tenuifolia* Hoffur, a troublesome form of the European *L. aquatica*, and secondly, the *Limosella tenuifolia* Nuttall. These conclusions completely agree with and confirm what I myself in Autumn, 1930, saw at Kenfig Pool.

THE LOCALITIES OF LIMOSELLA SUBULATA IN ENGLAND.

Sowerby's *English Botany*, which is the well-known basis for the flower study of the British Isles, makes no mention of *Limosella aquatica*, var. *tenuifolia*. Both in the first edition of the year 1796 and also in the third edition of 1866 only the well-known typical form of *Limosella aquatica* is figured. It is shown first as *Limosella aquatica*, var. *tenuifolia*—in which, however, *Limosella subulata* is included—in the newer English Flower books. So far as is known to me at present, the following localitics are those for the true *Limosella subulata*. Till now the known localities for *Limosella subulata* all lie in England and certainly in Wales.

THE KENFIG POOL.

Limosella subulata was first found by Prof. A. H. Trow in 1897 at Kenfig Pool. On 7/6/1901 Shoolbred and Marshall together (and for the second time Shoolbred on 12/7/1901) noticed it. By A. H. Trow it was seen for the second time in the year 1905 and the plant was then in greater abundance on sandy edges round the Pool.

The Kenfig Pool, also called Mawellom Pool, lies in South Wales in Glamorgan County. It is between Kenfig and the ocean, from which it is about 4-5 kilometres and about 30 kils. westerly from Cardiff. It consists of sand dunes supplied with characteristic dune-flora.

In autumn, 1930, I searched the locality myself and also in company with Miss E. Vachell of Cardiff. In the space of about 3 hours we made one round of the Pool, but could not find a trace of the *Limosella subulata*, although apparently the locus classicus was well known. But that is what one might expect from a plant which normally is annual but which only after the next muddy shore manages to develop and grow.

Evidently the pollen of the plants is produced abundantly after a rest-period of several years, and at a favourable moment suddenly comes to development. I have observed that other annual mud-inhabitants grow like this, such as *Heleocharis ovata*, *Carex cyperoides*, and *Gnaphalium luteo album*. Kenfig Pool is fresh water and shelters an Atlantic flower-element.

Especially abundant on the whole shore of Kenfig Pool is *Littorella lacustris*, which forms the entire turf.

Moreover, I met with and found abundantly the following plants sharing less or more: *Echinodorus ranunculoides, Juncus lampocarpus, Pot. heterophyllus* (submersed and land-form), *Myosotis caespitosa, Samolus Valerandi, Anagallis tenella* (very isolated), *Erythraea pulchella, Hydrocotyle vulgaris* (rather abundant), *Helosciadium nodiflorum* (creeping form), *Oenanthe fistulosa, Ran. Flammula*, var. *radicans.*

On our joint excursion to Kenfig Pool we nevertheless made another very interesting discovery in spite of not finding *Limosella subulata*, namely, we found in a small water puddle behind the little Inn near Kenfig Pool about a dozen plants of typical *Limosella aquatica.* As the distance of this small water puddle from Kenfig Pool itself is only very short, it is quite possible that on the shore of Kenfig Pool not only *Limosella subulata* is to be found there, but also *Limosella aquatica.* And then it is easily conceivable to us, and what probably happened, that W. P. Hiern when he examined *Limosella subulata* Ives and *Limosella aquatica*, var. *tenuifolia* Hoffur, had both before him at the same time; nevertheless he did not make any distinction between them.

THE RIVER GLASLYN.

In this locality *Limosella subulata* Ives (=*Limosella aquatica* L., var. *tenuifolia* Lej., or var. *tenuifolia* Hoffur) was collected by (a) Christopher H. Andrews on 25/8/1916, (b) Gambier-Parry and Daniel A. Jones in 1921, (c) Prof. Slater in 1925 and in July 1931. This second locality is not known to me and so I must depend on the brief communication of Prof. H. Slater and of Mr Gambier-Parry, both of whom know the locality. Prof. Slater had the kindness to look up the said locality in August 1930, but only to find that the plants could not be reached as the place had become full and was under water; so the following year in July he went to look at it again.

Here it maintains itself in a salt marsh in which the plant grows in the mud which probably at the time of the Spring tides is washed with salt water. According to the testimony of Prof. Slater, the following plants are in company with it: *Scirpus Savii, Scirpus parvulus, Juncus obtusiflorus* (=*Juncus articulatus, Juncus acutus*), *Spergularia salina, Glaux maritima, Plantago maritima*, and at some distance, nevertheless already outside the brackish water zone. Prof. Slater also noticed *Centunculus minimus* and *Radiola linoides.*

It is important to note that the place on the Glaslyn River lies in the brackish water zone. In N. America *Limosella subulata*, so far as is known to me, is always found on brackish water ground, although in N. America it is given as exceptional. Nevertheless, the typical *Limosella aquatica* is a fresh water swamp plant. Still, the neighbourhood should be examined to see if it supplies an exception.

Wheldon and Wilson (Note *a*) have put before us an account which, according to them, gives it in West Lancashire, the English locality in which *Limosella aquatica* is in fact flourishing on brackish water ground. And those from proved examples (Note *b*) in fact stand as the typical *Limosella aquatica* there. Also in Finland, where *Limosella aquatica* is widely spread, it grows here and there on brackish water mud, although it has colonised itself besides on fresh water mud. Against this I have arrived at the conclusion that also for Germany only one place has been found where *Limosella aquatica* prospers on brackish water shores.

Note *a*: *The Flora of West Lancashire.* Brackish pools near Overton and near Bolton-le-Sands.

Note *b*: In the Herbarium of the Natural History Museum in Cardiff. The examples referred to have the number 1163 and were collected by A. Wilson, August 1900.

THE MORFA SWAMP NEAR SWANSEA.

The Morfa swamp is situated in the neighbourhood of Swansea in Glamorganshire, S. Wales, and forms the third station for *Limosella subulata* Ives, about which till now there has been no publicity.

Recently this place was first found by Mr Arthur Webb, to whom I am indebted for this important locality. This surprising place is in one of the pools that does not contain any big plant growth and is near the little village of Morfa. The plant was on the surface of the ground in an area of 40 × 40 feet and was placed in such a manner and was flowering in such multitudes that the little white or somewhat pink blossoms were already conspicuous at a distance of some yards.

The locality is really not far away from the coast, but typical salt-plants were absent, and after viewing it Mr A. Webb says that it is not, or as good as not, influenced by brackish water.

CRUMLIN BOG IN WALES.

The so-called Crumlin Bog forms the fourth locality of *Limosella subulata* in England. This place was discovered by H. J. Riddlesdell in the year 1905. According to a communication by letter from Riddlesdell, Crumlin Bog lies not far from the coast of Swansea Bay and only a few kilometres Eastward of Swansea town. Crumlin Bog is of the swamp order and lies outside the zone of brackish water and at no time comes under the influence of the ebb and flow. *Limosella subulata* was only seen there in trifling amount by myself, and indeed only in one place which was free of the higher herbaceous vegetation. In the Crumlin Bog Riddlesdell also found formerly *Carex stricta*, *Ranunculus Lingua*, *Equisetum hyemale* and *E. variegatum*, *Samolus Valerandi* and *Glaux maritima*.

Unfortunately, however, in this locality *Limosella subulata* is in danger chiefly because the water in the Crumlin Bog remains under the influx of copper washing.

One dares not have any lingering doubt of Mr Riddlesdell's observations as he himself collected *Limosella subulata* at the Kenfig Pool.

Still further confirmation would be the appearance of a narrow-leaved *Limosella* in Cornwall; I should like to have the earliest information as to the discovery of such a form in that county, from which, so far, none has been recorded.

DISTRIBUTION OF LIMOSELLA AQUATICA IN THE BRITISH ISLES.

The typical *Limosella aquatica* has a wide range, reaching from Spain to China. A second range inhabits the Central and Western command of North America. In Tirol it reaches to the height of 1250 metres.

The typical *Limosella aquatica* has a big range in the British Isles. Arthur Bennett, who made a census of it, found that it grew in 36 counties. To these I can now add Glamorganshire, the above-mentioned locality at Kenfig Pool. The greater number of these counties belong to England itself; 4 of these counties belong to Scotland, Dumbartonshire, Haddington, Ayr, and Kincardine. The last-named locality is also the most northerly. To Ireland only 2 counties, Galway and Clare in the West. The number of the single localities amounts to 46 respectively according to Arthur Bennett, 47 including Glamorganshire, but some of the counties have more than one locality.

A NOTE ON THE GENUS SPARTINA.

PATRICK M. HALL, F.L.S.

The genus *Spartina*—Cord-grass—is of particular interest to Hampshire botanists for the reason that ours is almost certainly now the only county in which all three British species can be found, and one of them, moreover, actually originated on the shores of Southampton Water. It is, therefore, hoped that a short account of the history, distribution and characteristics of the species representing the genus in Britain will be of interest to the members of this Club. At the exhibits meeting held at Winchester early in October, 1933, I displayed a number of dried specimens of plants of interest to Hampshire botanists, among them examples of the three Spartinas, together with a short descriptive note: at the request of one or two members that note is published here in a slightly extended form.

The three British species of *Spartina* are:—

1. S. STRICTA Roth; a native plant of the south and east coasts of Britain. With the exception of Dorset this species has been recorded from all the littoral counties from S. Devon eastwards and northwards to Lincolnshire. The earliest British record is in Merrett's *Pinax*, 1666, where it is recorded from Crixey Ferry, Essex. The first Hants record is in the *Hampshire Repository*, 1799, near Portsmouth Harbour. It is clear from the list of habitats given in Townsend's *Flora of Hants* that it was at one time common along the coasts of S. Hants

and the Isle of Wight, wherever salt-marshes and estuarine mud-flats suitable to the plant's growth were to be found. But it has now been practically exterminated in the county by the third species to be mentioned below. At the present time it is doubtful whether this species is to be found on the mainland of Hants, but it occurs in considerable plenty in one or two salt-marshes in the Isle of Wight. This species has a wide distribution in Western and Southern Europe, N. Africa, and N. America.

2. S. ALTERNIFLORA Lois.; this species is believed to be of N. American origin and to have been accidentally introduced from that country to the estuary of the Itchen, whence it was recorded by Bromfield on August 8th, 1836. Thence the plant spread in such a manner that we find the following records in Townsend's *Flora*:—

> "profusely on the mud-flats of the Itchen river (1850)";
> "mud-banks on the Hamble, abundant (1871)";
> "abundantly at Hillhead (1872)";
> "now (1879) abundant by the Itchen."

The range of the species in Hampshire extended ultimately from Lymington in the west to the mouth of the Meon in the east. Outside Hampshire the only British record for this species is from Thorney Island in the extreme west of Sussex, and it is very doubtful whether it is still to be found there. In Hampshire, as far as is known, this species is now confined to two stations, in the estuaries of the Itchen and Test respectively, where it contrives to maintain a rather precarious existence. This species was also introduced from N. America to France and N. Spain.

3. S. TOWNSENDII H. & J. Groves. The origin of this plant is unknown, but it is now generally considered to be a hybrid resulting from the crossing of the two foregoing species. It was first recorded by Messrs H. & J. Groves from mud-flats near Hythe in 1878. From this point it must have spread for a time more or less slowly, because in the second edition of the *Flora* published in 1904 it was still possible for Townsend to describe the plant as "rare." It had by that time extended to Lymington estuary, the Medina (1895), Langstone Harbour and Hayling Island (1900). It had appeared in West Sussex sometime before 1903, as it is given for that county in the First Supplement of *Topographical Botany*. From the Second Supplement of the same work it appears to have been recorded from Dorset (1905), North Somerset (1918), and West Gloucestershire (1923). In recent years the plant has increased in the most remarkable manner, and, having practically submerged its two presumed parents, it has occupied the whole of the mud-flats of the creeks, estuaries and harbours of South Hampshire and the Isle of Wight. It has extended eastwards to Sussex and Kent, westwards to Dorset, and north-westwards to the estuaries of the Severn and Mersey.

Townsend (*Flora*, 2nd Edition, p. 481) was strongly of the opinion that the plant was a species: the discoverers of the plant originally described it as a variety of *S. stricta*, but subsequently (*Journal of Botany*, 1882) they described it as a species. In more recent years the theory has been gaining ground that this plant was of hybrid origin and this theory has been greatly reinforced recently by cytological study, that is by investigation of the structure and growth of the cells of tissue of which the plant is composed. It will be generally known that hybrids are usually variable: this arises from the imperfect fusion in varying degrees of the gametes of the two parents, so that the offspring vary more or less in their resemblance to one or other parent. Very occasionally such complete fusion takes place that the offspring contains the whole of the elements of both parents: this process is known as "allopolyploidy." Normally hybrid offspring are sterile as well as variable: the offspring resulting from allopolyploidy, known as polyploid hybrids, are exceptionally vigorous, uniform, and fertile; they breed true and behave in every way exactly as true species. A well-known example of a polyploid hybrid is the garden hybrid *Primula Kewensis*. It has been found that the number of chromosomes in the growing cell of *S. Townsendii* is 126, which number is the sum of the chromosome-numbers of *S. alterniflora* – 70 and *S. stricta* – 56. *S. Townsendii* therefore fulfils all the requirements of a polyploid hybrid and this theory of its origin explains how it has obtained the vigour which has enabled it to spread and supplant its parents. Incidentally it may be said that both theories of the origin of the plant were in a sense correct: it is at once a hybrid and a species.

This plant has also appeared in N. France and is believed there to have been of similar spontaneous origin. Owing to the rapidity with which the plant establishes itself on bare mud and forms islands by holding up silt, it has been used extensively in East Anglia and Holland for experiments in the reclamation of land.

The principal characteristics, by which the three species may be distinguished, are as follows:—

HABIT.

stricta.	Short and very rigid, 1-2 ft.
alterniflora.	Taller and much more graceful, up to 3 ft. or more.
Townsendii.	Rigid, 1-4 ft.

SPIKES.

stricta.	2-3 pressed closely together.
alterniflora.	6-8 loosely pressed together.
Townsendii.	4-9 rather spreading.

RACHIS.

(*i.e.*, the central stem of the spike from which the spikelets branch off.)

stricta.	Scarcely extending beyond the last spikelet.
alterniflora.	Produced beyond the spikelets and flexuose.
Townsendii.	Produced beyond the spikelets and flexuose.

OUTER GLUMES.

stricta.	Hairy.
alterniflora.	Glabrous except on the mid-rib.
Townsendii.	Slightly downy.

LEAVES.

stricta.	Jointed to the sheaths, broadest below the middle, but narrowing to the actual base, breaking off very easily at the joint with the sheath.
alterniflora.	Not jointed to the sheaths but continuous, broadest at the base and very long, tapering and slender, equalling and often overtopping the flowering spikes; the leaves are erect and parallel to the stems.
Townsendii.	Jointed to the sheaths but not breaking off as in *stricta*, broadest at the base where prominent auricles or shoulders project on either side beyond the outline of the stem; the leaves stand away at a considerable angle from the stem.

Note.—The characteristics of the leaves alone are quite sufficient for the identification of the three species, which can be very simply told apart by attention to the characters emphasised above.

Since the paper on *Spartina* has been printed (Proc. Hampshire Field Club and Archaeological Society, vol. xii, part 3) it has come to my knowledge that *S. stricta* does still exist in at least one station on the mainland of Hampshire. By the kindness of Mr N. D. Simpson, of Bournemouth, I have been able to see a good colony of this species on Hayling Island.

September 17th, 1934.

BOTANISING IN MONTENEGRO.

By C. D. Chase and Paule Cernjavski (University of Belgrade).

The following notes are the outcome of a Leplay tour to Montenegro in August 1934. A week was spent at the small mountain village of Zabljak at the foot of Durmitor (8294 feet). Until July 1934 the village was only accessible from Savnik by a bridle path and our party was the first to arrive by the new motor road from that place. Another road from Zabljak northwards across the deep gorge of the Tara is in course of construction; this will mean, when completed, direct communication with Belgrade. Zabljak will no doubt become a favourite resort and will often be visited by English tourists. Botanists among them will perhaps find the following list of interest.

As Zabljak lies at an altitude of some 4700 feet, it is itself in the montane or sub-alpine zone. Close to the village, above the pastures, are extensive Picea forests.

Durmitor is a self-contained massif with several distinct summits, the paths to which are not well defined. Although the flora of Durmitor is not so rich as that of the mountains of the Montenegrin-Albanian frontier district, it includes many rare plants. The formation is limestone.

To mention a few of the outstanding plants:—*Senecio rupestris* W.K. is very common everywhere, even to high up in the alpine zone, where some slopes are yellow with it. *Linum capitatum* Kit. and *Gentiana crispata* Vis. are also very common in the pastures but do not extend so far upwards.

A late-flowering plant is *Colchicum Visianii* Parl., very like *C. autumnale* but with a longer tube to the perigonium and shorter anthers. Of the alpine plants it will be seen that many are Balkan varieties of widely distributed species. Amongst the notable alpines which are also Balkan endemics are:—*Euphorbia capitulata* Rchb., *Arenaria Pancicii* Deg. et Bald., *Drypis Linnaeana* M. et W., *Sempervivum Kosaninii* Praeger, *Saxifraga Blavii* Eng., *S. Prenja* Beck., *Oxytropis dinarica* Murb., *Anthyllis pulchella* Vis., *Stachys Jacquini*, var. *lanata* Schiller, *Gnaphalium Pichleri* Murb., *Achillea abrotanoides* Vis., *Senecio Visianianus* Papaf., *Hieracium gymnocephalum* Gris., *Avena Blavii* Asch. et Jka.

We were particularly glad to come across *Sempervivum Kosaninii* Praeger, a new species recently named by Dr Praeger from a single plant in the botanic garden at Belgrade. We saw it again in the mountains above Pec.

The list follows Hayek's *Prodromus Florae Balcanicae.*

Plants seen on Durmitor, August 1934 :—

Botrychium Lunaria L.
Asplenium trichomanes L.
A. adiantum-nigrum L.
A. fissum Kit.
A. ruta-muraria L.
Ceterach officinarum DC.
Nephrodium filix-mas L.
N. rigidum Hoffm.
N. spinulosum Müll.
Polystichum Lonchitis L
P. lobatum Huds.
Cystopteris fragilis L.
C. regia L.
Juniperus nana Willd.
J. communis L.
Abies alba Mill.
Picea vulgaris Lk.
Pinus silvestris L.
P. Mughus Scop.
Salix retusa L.
S. caprea L.
Thesium alpinum L.
Rumex scutatus L.
R. acetosella L.
Oxyria digyna L.
Polygonum viviparum L.
Euphorbia capitulata Rchb.
E. myrsinites L.
E. amygdaloides L.
Scleranthus uncinatus Schur.
Minuartia bosniaca Beck.
M. verna (L.), ssp. *montana* Fzl.
M. graminifolia (Ard.), var. *clandestina* Port.
Arenaria rotundifolia M.B., var. *Pancicii* Deg. et Bald.
Moehringia muscosa L.
Sagina saginoides (L.), var. *macrocarpa* (Rchb.).
S. procumbens L.
Cerastium lanigerum Clem., var. *Dollineri* Beck.
C. lanigerum Clem., var. *albanicum* (Bald.).
C. lanigerum Clem., var. *durmitoreum* Rohl.
C. caespitosum Gilib.
Dianthus cruentus Grls.
D. deltoides L.
D. tergestinus A. Kern., var. *brevicalyx* (Beck.).
Stellaria nemorum L.
Drypis spinosa L., var. *Linnaeana* M. et W.
Silene Antelopum Freyn.
S. saxifraga L.
S. acaulis L., var. *balcanica* H. et V.
S. Sendtneri Boiss.
Heliosperma albanica K. Maly.
Melandryum album (Mill.), var. *thessalum* (Haussk.).
Anemone baldensis L.
Thalictrum minus L., var. *roridum* (Wallr.).
T. flavum L.
Ranunculus Thora L.
R. oreophilus M.B., var. *concinnatus* (Schott.).
R. carinthiacus Hoppe.
R. sardous Cr.
Corydalis ochroleuca Koch.
Erysimum crepidifolium Rchb.
Cardamine glauca Spreng.
Arabis crispata Willd.
Alyssum montanum L. (sens. lat.).
A. murale W.K.
Draba aizoides L.
D. aizoon Wahl.
Iberis sempervirens L.
Helianthemum grandiflorum Lam.
H. alpestre Jacq.
Viola biflora L.
V. latisepala Beck.
V. macedonica B. et H.
Hypericum alpinum W.K.
H. immaculatum (Murb.).
Linum capitatum Kit.
L. nervosum W.K.
L. narbonense L.
Oxalis acetosella L.
Geranium silvaticum L.
G. macrorrhizum L.
G. Robertianum L.
Polygala croatica Chod.
Acer Heldreichii Orph., ssp. *Visianii* (Nym.).
Rhamnus fallax Boiss.
Sempervivum Heufelii Schott.
S. Kosaninii Praeger.
Sedum magellense Ten.
S. album L.
S. ochroleucum Chaix.
S. atratum L.
S. dasyphyllum L.
S. glaucum W.K.
Saxifraga rotundifolia L.
S. adscendens L., var. *Blavii* Eng.
S. moschata Wulf.
S. Prenja Beck.
S. brevifolia Engl.
S. oppositifolia L., var. *meridionalis* (Terr.).
Ribes alpinum L.
Rubus idaeus L.
Potentilla clusiana Jacq.
P. Crantzii (Cr.).
P. baldensis A. Kern.
P. Tormentilla L.

Alchemilla Hoppeana (Rchb.). var. *velebitica* Deg.
Geum molle Vis. et P.
Rosa alpina L.
Dryas octopetala L.
Sorbus aucuparia L.
S. umbellata Desf., var. *cretica* Linde.
Cotoneaster tomentosa Ait.
Oxytropis campestris, var. *dinarica* Murb.
Vicia cracca L.
Ononis hircina Jacq.
Trifolium montanum L.
T. alpestre L.
T. flexuosum Jacq.
T. noricum Wulf.
Lotus corniculatus L.
Anthyllis Jacquini A. Kern.
A. pulchella Vis.
A. intercedens Beck.
Hippocrepis comosa L.
Onobrychis scardica Hal.
Genista tinctoria L.
Epilobium anagallidifolium Lam.
Bupleurum Sibthorpianum Sm.
Pancicia serbica Vis.
Athamantia Haynaldii Borb.
Peucedanum oligophyllum (Gris.).
Heracleum Pollinianum Bertol.
Laserpitium Siler L.
L. latifolium L.
Pleurospermum austriacum L.
Chaerophyllum cicutaria Vill.
Ch. aureum L.
Ch. aromaticum L.
Armeria canescens Host.
Arctostaphylos Uva ursi L.
A. alpina L.
Vaccinium Myrtillus L.
V. Vitis Idaea L.
Primula Columnae (Ten.).
Androsace villosa L.
Myosotis alpestris (Schm.), var. *firma* Nellr., var. *suaveolens* (W.K.).
Onosma stellulatum W.K.
Cerinthe minor L.
Verbascum Bornmülleri Vel.
Scrophularia laciniata (W.K.), var. *alpina* Heuff.
S. Scopolii Hoppe.
Digitalis ambigua Murr.
Veronica balcanica Vel.
V. officinalis L.
V. Orsiniana Ten.
V. urticaefolia Jacq.
V. aphylla L.
Euphrasia salisburgensis Funck.
E. hirtella Jord.
Melampyrum bosniacum Ronn.
M. vulgatum Pers.
Pedicularis verticillata L.
Alectorolophus minor (Ehrh.) W. Gr.
A. Rohlenae Stern.
Orobanche gracilis Sm.
O. caryophyllacea Sm.
Ajuga genevensis L.
Teucrium montanum L.
Prunella laciniata L.
Lamium inflatum Heuff.
Stachys Reinerti Heldr.
S. Jacquini Fritsch, var. *lanata* Schiller.
S. subcrenata Vis.
S. Karstiana (Borb.) Hay.
Micromeria croatica Pers.
Calamintha patavina Host.
C. granatensis B. et R.
Thymus balcanus Borb.
T. moesiacus Vel.
Globularia bellidifolia Ten.
Plantago media L., var. *pindica* Hauss.
P. argentea Chaix.
P. montana Huds.
Gentiana lutea L., var. *symphyandra* Murb.
G. cruciata L.
G. asclepiadea L.
G. verna L., var. *tergestina* (Beck.).
G. utriculosa L.
G. crispata Vis.
Asperula longiflora W.K.
A. longiflora W.K., var. *condensata* Heldr.
A. odorata L.
Galium anisophyllum Vill.
Lonicera alpigena L.
L. coerulea L.
Valeriana montana L.
Knautia dinarica (Murb.).
Scabiosa leucophylla Borb.
S. columbaria L.
S. Portae A. Kern.
S. silenifolia W.K.
Campanula pseudolanceolata Pant.
C. patula L.
C. glomerata L.
Phyteuma spicatum L., ssp. *coerulescens* Bogenh.
P. orbiculare L., var. *flexuosum* R. Schultz.
Edraianthus graminifolius L., var. *subalpinus* Wettst.
E. graminifolius L., var. *Baldaccii* Janch.
Solidago alpestris W.K., var. *vestita* Hal.
Aster Bellidiastrum L.
Erigeron polymorphus Scop.
E. acer L.
Gnaphalium Pichleri Murb.

G. silvaticum L.
Anthemis montana L.
Achillea abrotanoides Vis.
A. distans W.K.
A. argentea Vis.
Chrysanthemum tenuifolium Kit.
Ch. leucanthemum L.
Homogyne alpina L.
Adenostyles Alliariae Gon.
Doronicum Columnae Ten.
Senecio Visianianus Papaf.
S. Fuchsii Gmel.
S. rupestris W.K.
Jurinea pluriceps C. Koch.
Carlina acaulis L., ssp. *alpina* Jacq.
Carduus candicans W.K.
Cirsium Velenovskyi Vand.
C. acaule All.
Centaurea cana S.S.
Hypochaeris macedonica Form.
Leontodon hispidus L., var. *glabratus* (Koch).
L. crispus Vill.
Scorzonera rosea W.K.
Taraxacum erectum Schrk.
Picris hieracioides L.
Mulgedium alpinum L.
Crepis conyzifolia Gon., ssp. *montenegrina* Rohl.
C. aurea L.
C. biennis L.
Hieracium bifidum Kit.
H. villosum L.
H. glabratum Hoppe.
H. gymnocephalum Gris.
H. sabinum Seb. et M.
Polygonatum officinale All.
Allium carinatum L.
Veratrum album L.
Colchicum Visianii Parl.
Luzula silvatica Huds.
Carex divulsa Good.
C. gracilis Curt.
C. nigra All.
C. laevis Kit.
Phleum Michelii All.
Bromus transsilvanicus Steud.
Sesleria tenuifolia Schrad.
Agrostis canina L.
Cynosurus cristatus L.
C. echinatus L.
Poa pumila Host.
P. nemoralis L.
P. alpina L.
Festuca sulcata Hack.
F. heterophylla Lam.
Koeleria splendens Presl.
Deschampsia flexuosa Trin.
Avena Blavii Asch. et Jka.
Calamagrostis villosa Chaix.
Helleborine atropurpurea Rafin.

RECENT ROSA ADDITIONS TO THE FLORA OF SURREY.

Edmund B. Bishop.

Since the publication of Col. Wolley-Dod's *Rosa* Addendum to the *Flora of Surrey* (Salmon), many additional records have come under my personal notice. Those deemed worthy of mention are set out, with amplifications, in the following pages. In most cases, especially of those pre-1933, the specimens have been named by Col. Wolley-Dod, often (as is inevitable in *Rosa*) with reservations more or less important. Only very rarely has any case of serious doubt been included in these notes, and then always with its frank admission. When a specimen is stated to fit or to approach one of Keller's numerous varieties or formae, such statement is made on my own responsibility (unless otherwise made clear), and must not necessarily be considered as implying the approval of Col. Wolley-Dod. The arrangement, nomenclature, etc., of these notes is strictly in accordance with that of *A Revision of the British Roses* (Wolley-Dod).

With very few exceptions, which are duly acknowledged, all the specimens were collected by my sister (Mrs C. L. Wilde) or by myself. Those due to her are distinguished by a following *W.*, their names having been confirmed by me. The remainder are of my own gathering.

In these notes I have given selected records for Districts (or Sub-Districts) *not represented in Wolley-Dod's Addendum by that particular species, variety or forma.* Only in one or two instances of very rare Roses have I added new localities to a District in which that particular Rose has been already recorded by Col. Wolley-Dod. The Districts and Sub-Districts are those adopted by Salmon in his " Flora."

It will be seen that the Sub-Districts most worked by my sister and myself are III (a) and X (b), the most convenient from our dwelling-place.

The N.C.R. mark (*) means, *in these notes*, that the Rose in question was not definitely recorded in Col. Wolley-Dod's Addendum aforesaid.

" Keller " and " Synopsis," of frequent occurrence in these notes, are convenient abbreviations for Dr Robert Keller's monumental work, *Synopsis Rosarum Spontanearum Europae Mediae.*

Only in the cases where such is explicitly stated have specimens been submitted to Dr Keller and named by him.

R. ARVENSIS Huds.

Var. *vulgaris* Ser.

f. *major* Coste .... X (b). Near Grayswood.

f. *baldensis* (Kern.) J. B. von Keller .... X (b). Hambledon Hurst.

*f. *hispida* Lej. & Court.	III (a).	Elstead Common, *W*.
	III (b).	Foxbury Copse, Hascombe.
	IV.	Between Martyr's Green and Effingham Junction, *W*. (With ovoid fruit.)
	X (b).	Chiddingfold. Grayswood. Hambledon Hurst.
Var. *ovata* (Lej.) Desv	III (a).	Stony Hill, Puttenham, *W*.
Var. *biserrata* Crép.	III (a).	Munstead. Lydling.
	X (b).	Chiddingfold. Dunsfold Common. Grayswood (two interesting forms which do not fit any of Keller's formae).
Var. *laevipes* Gremli	III (a).	Stony Hill, Puttenham, *W*.
	X (b).	Chiddingfold (excellent). High Loxley, Dunsfold, *W*.
R. STYLOSA Desv.		
Var. *Desvauxiana* Ser.	III (a).	Littleton Sandpit, *W*. (Provisionally, as a small f. Very likely a hybrid.)
	X (b).	Hambledon Hurst, Chiddingfold, *W*. (Another small f., also a possible hybrid.)
Var. *systyla* (Bast.) Baker.		
f. *lanceolata* Lindl.	III (a).	Stony Hill, Puttenham, *W*.
	III (b).	Hascombe. (With untypically smoothish peduncles.)
	VI.	Mickleham Downs. (Form with small leaflets; untypical in certain respects.)
	X (b).	Dunsfold, *W*. Chiddingfold. (Nearest *lanceolata*, but with short styles, suggestive of f. *brachystyla* R. Kell.)
f. *leucochroa* (Desv.) Ser.	X (b).	Chiddingfold (locally common). Hambledon Hurst.
*Var. *cristata* W.-Dod.	III (a).	Seale, *W*.
	X (b).	Dunsfold Common.

[This variety was not described and published by Col. Wolley-Dod until after his Addendum to *Flora of Surrey* had gone to press.]

[R. STYLOSA hybrids.

Arising out of a number of submissions at various times, through Col. Wolley-Dod to Dr Robert Keller, determinations in the cases under-mentioned—necessarily ± cautious—have been received. Neither of those set out below has been adequately described and published, but it is hoped that opportunity may arise at an early date.

R. stylosa Desv. × *R. canina* L.	II.	Near Dolley's Farm, Horsell. (*Herb. E.B.B.* Ref. No. R.6A.)
	X (b).	Chiddingfold, *W*. (*Herb. E.B.B.* Ref. No. R.5A.)
R. stylosa Desv. × *R. dumetorum* Thuill.	X (b).	Chiddingfold. (*Herb. E.B.B.* Ref. No. R.10A.) Dunsfold Common. (*Herb. E.B.B.* Ref. No. R.11A.)]
R. SPINOSISSIMA L. (Agg.)	III (a).	Witley Common (edge of, on boundary bank). *W. Watson*. (No fruit, probably garden escape.)

Var. *typica* W.-Dod.	
f. *rosea* Koch	III(a). Munstead, *F. A. Marsh.* (On rough bushy, rose-strewn, steep hillside, well away from houses or gardens.)
R. CANINA L.	
Var. *lutetiana* (Lem.) Baker.	
f. *lasiostylis* Borb.	III(a). Witley Common, *W.* III(b). Hascombe, *W.* X(b). Chiddingfold, *W.* (With spreading to suberect sepals.)
Var. *sphaerica* (Gren.) Dum.	III(b). Hascombe.
Var. *flexibilis* (Déségl.) Rouy	III(b). Hascombe. X(b). Dunsfold. Grayswood *W.*
Var. *senticosa* (Ach.) Baker	X(b). Dunsfold Common.
f. *oxyphylla* (Rip.) W.-Dod	X(b). Dunsfold Common.
f. *mucronulata* (Déségl.) W.-Dod	III(a). Munstead. Peasmarsh
Var. *spuria* (Pug.) W.-Dod.	
f. *syntrichostyla* (Rip.) Rouy	III(a). Munstead. Hurtmore. III(b). Hascombe. X(b). Grayswood.
Var. *globularis* (Franch.) Dum.	III(b). Hascombe. X(b). Chiddingfold, *W.*
Var. *ramosissima* Rau	X(b). Grayswood, *W.*
Var. *dumalis* (Bechst.) Dum.	III(a). Compton. Lydling. Elstead, *W.* X(b). Dunsfold.
f. *viridicata* (Pug.) Rouy	III(a). Munstead. Lydling. Witley Common, *W.* III(b). Hascombe, *W.*
f. *cladoleia* (Rip.) Rouy	III(a). Farncombe. Elstead. Elstead Common (a form near f. *acrophylla* R. Kell.).
Var. *stenocarpa* (Déségl.) Rouy	III(a). Compton. Witley Common. Elstead. III(b). Hascombe. X(b). Grayswood.
Var. *biserrata* (Mér.) Baker	III(a). Elstead Common. Loseley, *W.* X(b). Chiddingfold, *W.*
f. *sphaeroidea* (Rip.) W.-Dod	X(b). Chiddingfold, *W.*
f. *eriostyla* (Rip.) W.-Dod	III(a). Munstead. Littleton. III(b). Snowdenham, near Bramley. X(b). Dunsfold Common ("nearest *eriostyla*," *W.-D.*).
Var. *fraxinoides* H. Br.	III(a). Elstead Common. X(b). Dunsfold.
f. *recognita* Rouy	III(a). Witley Common (with densely hispid styles), *W.* III(b). Hascombe, *W.*
Var. *sylvularum* (Rip.) Rouy	III(b). Hascombe. X(b). Grayswood.
f. *adscita* (Déségl.) Rouy	III(a). Hurtmore ("I think nearest *adscita*, but it may be *firmula* Godet," *W.-D.*). Munstead. Thursley Common.
Var. *andegavensis* (Bast.) Desp.	III(a). Stony Hill, Puttenham (somewhat sub-biserrate, may perhaps be a hispid-styled form of var. *hirtella* Chr.).

	III (b).	Hascombe. (Not infrequently, in this locality and elsewhere, a form occurs with weakly glandular peduncles, subglobose fruit, and smallish leaflets.)
	X (b).	Chiddingfold, *W.*
f. *agraria* (Rip.) W.-Dod	X (b).	Grayswood. (Form with very small leaflets.)
Var. *verticillacantha* (Mér.) Baker	III (a).	Shackleford (perhaps a f. of var. *adenocalyx* R. Kell.). Thursley Common, *W.* (Weakly biserrate, fits var. *hirtella* Chr., seemingly nearest f. *pontiacensis* R. Kell.) Near Scale, *W.*
f. *clivicola* Rouy	II.	Durnford Bridge, near Woking, *W. Biddiscombe*.
	III (a).	Thursley Common, *W.* (Some peduncles smooth; fits var. *adenocalyx* R. Kell.) Witley Common. (A fairly good fit for var. *adenocalyx* R. Kell., f. *mandellensis* R. K.) Witley Common. (Three bushes, with leaflets weakly biserrate, seem to come under var. *hirtella* Chr.)
	VI.	Cold Norton, near Hatchford, *W.* (Two adjacent bushes fit var. *verticillacantha* (Mér.) Baker, f. *fallacina* R. Kell.)
	X (b).	Grayswood, *W.*
Var. *Pouzini* (Tratt.) W.-Dod.		
*f. *anglica* Dingl.	II.	Near Dolly's Farm, Horsell, *W. Biddiscombe*, 1932. (But with hispid styles.) (*Herb. E.B.B.* Ref. No. R.1043.)
	VII.	Ham Common, *W.*, 3rd August 1927. Also with hispid styles. Ref. No. R.583.
Var. *Blondaeana* (Rip.) Rouy	III (a).	Thursley Common, *W.* (An untypical form.)
	X (b).	Chiddingfold, *W.*
f. *vinacea* (Baker) Rouy	III (a).	Witley Common, *W.* Chiddingfold, *W.*
f. *Beatricis* (Burn. et Greml.) Rouy	III (a).	Witley Common.
Var. *latebrosa* (Déségl.) N. E. Br.	X (b).	(On p. 671, *Fl. of Surrey*, " Bunningfold, near Chiddingfold " should read " Burningfold, near Dunsfold.") Also found in a few places near Chiddingfold, *W.*

R. DUMETORUM Thuill. (Aggregate).

Several specimens cannot further be segregated, either from Keller or from Wolley-Dod. But there is one of special interest—from X (b), Hambledon Hurst, *W.*—which (from Keller) seems, in most respects, very near var. *hirtifolia* Braun, f. *perciliata* Braun, but has very long peduncles, and long spreading-erect sepals. (*Herb. E.B.B.* Ref. No. R.1087.)

Var. *typica* W.-Dod	X (b).	Dunsfold.
f. *urbica* (Lem.) W.-Dod	III (a).	Hurtmore. Peasmarsh. Lydling and elsewhere. Witley Common, *W*. (By Synopsis a very good fit for var. *platyphylla* (Rau), f. *acanthina* (Déségl. et Ozan.) except that fruit is broadly ovoid, not globose.) (*Herb. E.B.B.* Ref. No. R.1576.)
	III (b).	Shalford Common. Hascombe.
f. *semiglabra* (Rip.) W.-Dod	III (b).	Hascombe.
	X (b).	Furnace Bridge, Dunsfold. (Perhaps *R. vulgaris* Gams, var. *puberula* R. Kell., f. *subcuneata* Schwertschl.)
Var. *ramealis* (Pug.) W.-Dod	III (a).	Peasmarsh, *W*.
Var. *Gabrielis* (F. Gér.) R. Kell.	II.	Near Horsell Common, *W*. (Very near var. *platyphylla* (Rau), f. *myrtillina* Braun.)
	VI.	Near Hatchford, *W*.

[Our West Surrey forms are often ± intermediate between *Gabrielis* and *calophylla*, and very difficult to allocate satisfactorily.]

Var. *calophylla* Rouy	III (a).	Witley Common. Elstead. Compton.
	VI.	Hatchford, *W*.
	X (b).	Grayswood, *W*. (With untypically ovoid fruit. Wolley-Dod says that it seems to fit f. *saxicola* Braun, in Keller.)
Var. *platyphylla* (Rau) W.-Dod	III (a).	Hurtmore. Elstead, *W*. Witley Common, *W*. (With glabrous styles and rising sepals. By Synopsis it seems a fair fit for var. *subglabra* (Borb.), f. *uncinelloides* (Pug.) Braun.)
	IV.	Broad Street Common, *W*.
	X (b).	Dunsfold Common (as *jactata*). Grayswood.
Var. *sphaerocarpa* (Pug.) W.-Dod	III (a).	Witley Common, *W*. Elstead, *W*.
	III. (b).	Hascombe (towards *spinetorum*).
	X (b).	Dunsfold.
f. *spinetorum* (Déségl. et Ozan.) W.-Dod	III (a).	Elstead.
	VI.	Hatchford (fruit not quite typical), *W*. (By Synopsis, a fairly good fit for var. *hirtifolia* Braun, f. *Richteri* Braun.)
	X (b).	Chiddingfold.
Var. *hemitricha* (Rip.) W.-Dod	III (a).	Seale (near Church). Williams Copse, Seale (a very distinct form, which seems to fit nothing in Keller). Near Perry Bridge, Farncombe (another distinct form, which seems to lack a name), *W*.
	X (b).	South Park (Witley Parish). Dunsfold (with rising sepals).
Var. *erecta* W.-Dod.	III (a).	Ockley Common. Elstead.

Var. *Deseglisei* (Bor.) Chr.	II.	Near Scotcher's Farm, Horsell, *W. Biddiscombe.*
	III (a).	Loseley Meadows, *W.* (N.C.R. in 1928).
*f. *Rohreri* R. Kell.	III (a).	Witley Common, several bushes.

[Differs from var. *Deseglisei* chiefly in its large leaflets, large elongate fruit, glabrous styles, and flat disc. New to Britain. First found by me, September 1931.]

Var. *incerta* (Déségl.) W.-Dod.		
*f. *laevistyla* W.-Dod	II.	Near Dolley's Farm, Horsell.
*f. *subglabra* W.-Dod	III (a).	Hog's Back, Compton.
Var. *seticaulis* W.-Dod	VI.	Hatchford, *W.* (Another bush of this extremely rare Rose, found about ¼ mile from the original bush of Col. Wolley-Dod. Mrs Wilde's bush differs from the original in shape of fruit, hispidity of styles, etc. See *B.E.C. Report*, 1933, pp. 525-6.)
R. AFZELIANA Fr. (R. GLAUCA Vill.)		
Var. *subcanina* Chr.	III (a).	Littleton, near Guildford.
	III (b).	Hascombe. (Both with some doubt; possibly forms of *R. canina*, var. *globularis*.)
Var. *denticulata* R. Kell.		
*f. *subcomplicata* Hayek.	X (b).	Chiddingfold, *W.*
R. OBTUSIFOLIA Desv.		
Var. *typica* W.-Dod.	III (a).	Quite common around Godalming.
	IX.	Limpsfield Common.
	X (b).	Dunsfold.
Var. *tomentella* (Lem.) Baker	III (a).	Peasmarsh. Loseley. Elstead. Stony Hill, Puttenham, *W.*
	III (b).	Malquoits Wood, Ewhurst.
	IV.	Broad Street Common, *W.*
	VI.	Great Bookham Common. Banks Common. Hatchford, *W.*
f. *canescens* (Baker) W.-Dod	III (a).	Peasmarsh. Royal Common, Elstead (as *Carionii*).
Var. *decipiens* Dum.	II.	Near Dolley's Farm, Horsell, *W. Biddiscombe.*
	III (a).	Loseley, *W.*
f. *glandulosa* Crép.	II.	Near Dolley's Farm, Horsell, *W. Biddiscombe.*
Var. *Rothschildii* (Druce) W.-Dod	X (b).	Chiddingfold, *W.* (A very weak form.)
*× *R. surreyana* W.-Dod. (*R. obtusifolia*, var. *Borreri* × *R. canina*)	X (b).	Hurst Hill, Dunsfold, *W. Biddiscombe*, in 1929. Chiddingfold, *E.B.B.*, in 1930.

These are the Roses recorded (under var. *Borreri*) for the stations mentioned in *Fl. of Surrey*, p. 674. Fully described and named in *A Revision of the British Roses* (Col. A. H. Wolley-Dod), p. 103.

R. TOMENTOSA Sm.		
Var. *typica* W.-Dod	III (a).	Compton Heath. Bummoor Copse, Compton (towards *R. Sherardi*).

f. *eglandulosa* W.-Dod	III (a).	Compton Heath.
	IX.	At foot of downs above Oxted, *R. W. Robbins*.
Var. *pseudo-cuspidata* (Crép.) Rouy	III (a).	Milford Heath, *Miss M. R. Morley*.
	IX.	Itchingwood Common, *R. W. Robbins*.
R. RUBIGINOSA L.		
Var. *typica* W.-Dod	III (a).	Witley Common, *W*. (A form new to me, making a faint approach to var. *jenensis*, but certainly not that var. It has smooth fruit, weakly glandular peduncles, and subglabrous or very weakly hispid styles. Near var. *finitima* Dingl. Ref. No. R.1593, *Herb. E.B.B.*)
*f. *Corstorphinae* Druce	III (a).	Witley Common, *W*.
Var. *echinocarpa* (Rip.) Gren.	III (a).	Witley Common, *W*. (Rather a weak form, but with many acicles on stems, and a few on flowering branches, peduncles and fruit; also with suprafoliar glands on every leaflet examined).
R. MICRANTHA Sm.		
Var. *typica* Chr.	III (a).	Munstead. Thursley Common. *W*. Stony Hill, Puttenham (approaching *operta*).
	III (b).	Albury Downs. Hascombe.
	X (b).	Chiddingfold; also from Chiddingfold, a strong-growing form with large leaflets near f. *macrophylla* Coste. Brook Street, Witley. Grayswood, *W*.
Var. *operta* (Pug.) W.-Dod	III (a).	Stony Hill, Puttenham. *W*.
	X (b).	Dunsfold Common, *W*.
Var. *septicola* (Déségl.) Gren.	III (a).	Near sandpit, Littleton.
	X (b).	Chiddingfold, *W*. (A robust form, with some leaflets larger and broader than in type, thus making some approach towards f. *subpermixta* Rouy.)
*Var. *Burgessi* Bishop	X (b).	Near Haslemere. (For full description, etc., see *B.E.C. Rep.*, 1933, pp. 468 to 471. It is quite distinct from any other British var. or f. of *R. micrantha*).
R. AGRESTIS Savi.		
Var. *typica* R. Kell.		
f. *arvatica* (Pug.) Rouy	III (b).	Hascombe (several bushes).

[Var. *belnensis* Rouy. Following upon the remarks of Col. Wolley-Dod in *Flora of Surrey*, p. 679, concerning records of this var. from Hammer Ponds, Thursley, my experience leads me to share his doubts. Both Mrs Wilde and I have searched carefully, again and again, round these ponds, and upon the adjacent Common, but have found nothing which will pass as *belnensis*. We have found four bushes of *R. agrestis*, differing considerably in some features, which—at least for the present—can only be put under f. *arvatica*.]

ROSA NOTES FOR 1934.

EDMUND B. BISHOP.

Since the completion of the foregoing communication on "Recent Rosa Additions to the Flora of Surrey," lack of spare time, due chiefly to continued illness at home, has compelled me to restrict notes concerning other Counties solely to N.C.Rs. This regrettable curtailment means that I am bound to hold over, for the present, comments on some interesting and puzzling Roses. By "N.C.R." must be understood (as in my previous notes) new to the records kept by Col. Wolley-Dod, the nomenclature of whose "Revision" is followed as usual. Where the * is added it signifies N.C.R. to *Comital Flora* list also.

These notes arise out of personal submissions to me by the members mentioned, as well as from specimens collected by my sister, Mrs C. L. Wilde, and me during last season.

Collected by Mrs E. M. MACALISTER HALL, of Killean:—

194/7h. R. CANINA L., var. DUMALIS (Bechst.) Dum., f. VIRIDICATA (Pug.) Rouy.

194/7b. R. CANINA L., var. DUMALIS (Bechst.) Dum., f. CLADOLEIA (Rip.) W.-Dod.

194/10c. R. DUMETORUM Thuill., var. TYPICA W.-Dod, f. SEMIGLABRA (Rip.) W.-Dod.

The above three are from Weston, near Hitchin, Herts, v.-c. 20.

194/6a. R. CANINA L., var. LUTETIANA (Lem.) Baker, a small form. Wicken Fen, Cambs, v.-c. 29.

*194/12e(2). R. AFZELIANA Fr., var. GLAUCOPHYLLA (Winch) W.-Dod. St Cyrus, Kincardine, v.-c. 91.

194/21c. R. VILLOSA L., var. MOLLIS Sm., f. GLANDULOSA W.-Dod. Between St Cyrus and Montrose, Kincardine, v.-c. 91.

194/12k. R. AFZELIANA Fr., var. DENTICULATA R. Kell., f. SUBCOMPLICATA Hayek. Crinan, Argyll, v.-c. 98.

194/23a. R. SPINOSISSIMA L., var. TYPICA W.-Dod. Killean, Kintyre, v.-c. 101.

194/23c. R. SPINOSISSIMA L., var. TYPICA W.-Dod, f. ROSEA Koch. Killean, Kintyre, v.-c. 101.

*194/19a. R. TOMENTOSA Sm., var. TYPICA W.-Dod. Killean, Kintyre, v.-c. 101.

Collected by Miss E. S. TODD:—

194/12k. R. AFZELIANA Fr., var. DENTICULATA R. Kell., f. SUBCOMPLICATA Hayek. Glen Urquhart, Inverness-shire (E), v.-c. 96. (Confirms a doubtful record.)

194/21c. R. VILLOSA L., var. MOLLIS Sm., f. GLANDULOSA W.-Dod. "Inverness." (Probably from v.-c. 96, but should be recorded with a ?. Already recorded from v.-c. 97).

Collected by Mr P. G. Beak, at Mattingley, Hants (N.), v.-c. 12:—

194/8b. R. canina L., var. andegavensis (Bast.) Desp., f. agraria (Rip.) W.-Dod. Det. A. H. W.-Dod.

*194/9b. R. canina L., var. blondaeana (Rip.) Rouy, f. vinacea (Baker) Rouy.

Collected by Mr A. E. Wade, F.L.S., in Monmouthshire. v.-c. 35:—

194/2e. R. arvensis Huds., var. ovata (Léj.) Desv. Between Castleton and Marshfield.

194/6a. R. canina L., var. lutetiana (Lem.) Baker. Coedkernew.

*194/7j. R. canina L., var. sylvularum (Rip.) Rouy, f. adscita (Déségl.) Rouy. Marshfield.

194/10m. R. dumetorum Thuill., var. hemitricha (Rip.) W.-Dod. Coedkernew. (*Note—Com. Fl.* does not give 35 for 194/10 but the *Welsh Plant List* does.—P.M.H.)

*194/12e(2). R. Afzeliana Fr., var. glaucophylla (Winch) W.-Dod. Marshfield.

Collected during the delightful and memorable B.E.C. Week-end in Upper Teesdale, June 22nd to 25th *et seq.*, 1934. Although the time of year was too early for satisfactory specimens of Roses, yet among the many good things observed of all Orders the following *Rosa* N.C.Rs. could be determined by me:—

From County Durham, v.-c. 66.

194/23c. R. spinosissima L., var. typica W.-Dod, f. rosea Koch. Near Hanging Shaw, Forest-in-Teesdale. Coll. Mrs Rose Dallas.

From Yorkshire, N.W., v.-c. 65.

All from near Winch Bridge, the first mentioned below having been found by Miss C. M. Rob, the others by Mrs C. L. Wilde:—

194/23c. R. spinosissima L., var. typica W.-Dod, f. rosea Koch.

194/12j. R. Afzeliana Fr., var. subcanina Chr.

194/12l. R. Afzeliana Fr., var. denticulata R. Kell.

194/12r. R. Afzeliana Fr., var. Briqueti (R. Kell.) W.-Dod. (At least three bushes of this. Rather a weak form: weak, that is, in number of subfoliar glands, and in number of glands on peduncles. Both are, however, distinctly in evidence on gatherings from every bush.)

194/20h. R. Sherardi Davies, var. suberecta (Ley).

194/20i. R. Sherardi Davies, var. suberecta (Ley), f. glabrata Ley. I feel reasonably safe in naming this, though it seems to be the first record for an *English* county.

Collected by me near Ketton, Rutland (part of), v.-c. 55, 29/6/34:—

194/7d. R. canina L., var. medioxima (Déségl.) Rouy. Seems to come under this var., but as styles are strongly hispid I prefer to say ? **N.C.R.**

194/10b. R. DUMETORUM Thuill., var. TYPICA W.-Dod, f. URBICA (Lem.) W.-Dod.

Collected during a visit to Thetford, Norfolk, September 5th to 19th, 1934. Except the five marked "E.B.B.," all were found by Mrs C. L. WILDE: —

From Norfolk (W.), v.-c. 28.

194/2a. R. ARVENSIS Huds., var. VULGARIS Ser. Thetford. E.B.B.
194/6a. R. CANINA L., var. LUTETIANA (Lem.) Baker. Wretham: near Thetford. E.B.B.
194/6a. R. CANINA L., var. LUTETIANA (Lem.) Baker, f. LASIOSTYLIS Borb. Near Thetford: Wretham.
194/6i. R. CANINA L., var. SENTICOSA (Ach.) Baker, f. OXYPHYLLA (Rip.) W.-Dod. Near Thetford. Not without doubt: so ? N.C.R.
194/6l. R. CANINA L., var. SPURIA (Pug.) W.-Dod. Croxton: Wretham.
194/6n. R. CANINA L., var. GLOBULARIS (Franch.) Dum. Thetford.
*194/7. R. CANINA L., var. DUMALIS (Bechst.) Dum. Croxton: near Thetford.
*194/7h. R. CANINA L., var. DUMALIS (Bechst.) Dum., f. VIRIDICATA (Pug.) Rouy. Near Thetford: Wretham. E.B.B.
*194/7c. R. CANINA L., var. STENOCARPA (Déségl.) Rouy. Weeting.
*194/7k. R. CANINA L., var. FRAXINOIDES H. Br., f. RECOGNITA Rouy. Wretham.
194/8e. R. CANINA L., var. VERTICILLACANTHA (Mér.) Baker. Near Thetford. E.B.B.
194/8e. R. CANINA L., var. VERTICILLACANTHA (Mér.) Baker, f. CLIVICOLA Rouy. Croxton.
194/10b. R. DUMETORUM Thuill., var. TYPICA W.-Dod, f. URBICA (Lem.) W.-Dod. Near Thetford: Croxton: Wreatham. E.B.B.
194/10c. R. DUMETORUM Thuill., var. RAMEALIS (Pug.) W.-Dod. Near Thetford.
194/10f. R. DUMETORUM Thuill., var. GABRIELIS (F. Gér.) R. Kell. Near Thetford: Weeting.
194/10i. R. DUMETORUM Thuill., var. SPHAEROCARPA (Pug.) W.-Dod. Kilverstone.
194/10m. R. DUMETORUM Thuill., var. HEMITRICHA (Rip.) W.-Dod. Kilverstone.
*194/20c. R. SHERARDI Davies, var. OMISSA (Déségl.), f. RESINOSOIDES (Crép.). Near Thetford.

From Suffolk (W.), v.-c. 26.

194/23. R. SPINOSISSIMA L. (agg., no fruit). Barnham.
194/6a. R. CANINA L., var. LUTETIANA (Lem.) Baker. Brandon: Barnham Cross Common.
194/6h. R. CANINA L., var. SENTICOSA (Ach.) Baker. Brandon: Barnham Cross Common.

194/6i. R. CANINA L., var. SENTICOSA (Ach.) Baker, f. OXYPHYLLA (Rip.) W.-Dod. Barnham Cross Common.

194/6r. R. CANINA L., var. RAMOSISSIMA Rau. Brandon.

194/7c. R. CANINA L., var. STENOCARPA (Déségl.) Rouy. Brandon.

194/10b. R. DUMETORUM Thuill., var. TYPICA W.-Dod, f. URBICA (Lem.) W.-Dod. Barnham Cross Common.

194/10f. R. DUMETORUM Thuill., var. GABRIELIS (F. Gér.) R. Kell. Brandon.

*194/19a. R. TOMENTOSA Sm., perhaps a form of var. TYPICA W.-Dod. (N.C.R. for aggregate species, but must be only ? N.C.R. for var. *typica*.) Brandon.

194/15f. R. RUBIGINOSA L., var. ECHINOCARPA (Rip.) Gren. Near Brandon. Two bushes seen, about half-a-mile apart. One rather a weak form, but the other a magnificent example of this interesting variety, by far the best that has come under my notice.

DESIDERATA.

FLORA OF WESTMORLAND. Mr Albert Wilson, F.L.S., Tir-y-Coed, Ro Wen, Conway, is very desirous of obtaining any plant records for this county, to include in the Flora now preparing.

THE NORTHERN NATURALISTS' UNION is collecting material for the publication of a "Flora" of the Counties of Northumberland and Durham and will be most grateful for help from botanists who have done any work in the area or from anyone who can contribute information on the subject of the occurrence and distribution of plants therein. Notes, records, or other material should be addressed to:—George W. Temperley, 4 Selborne Avenue, Low Fell, Gateshead, Co. Durham.

DR W. A. SLEDGE, Dept. of Botany, The University, Leeds, is anxious to obtain a copy of the *B.E.C. Report* for 1903, to complete a set.

At the last Conversazione, 14th November 1934, Miss Burton again exhibited some of her extremely beautiful water-colour paintings of British wild flowers, and these were greatly admired by the members present. In our last Report (p. 622) we gave a list of species still required to complete all those in Fitch & Smith's Illustrations, and we are greatly indebted to those who supplied any of these. We shall be grateful to any member who can send a fresh and typical specimen of any of the following list—still needed—to Miss Lucy Burton, Stott Park, Lake Side, Ulverston, Lancs.:—

40. *Papaver Argemone*. 43. *Roemeria hybrida*. 48. *Matthiola incana*. 49. *M. sinuata*. 57. *Arabis Turrita*. 59. *A. alpina*. 91.

Draba incana. 94. *Camelina sativa.* 110. *Isatis tinctoria.* 116. *Reseda alba.* 124. *Viola arenaria.* 128. *Frankenia laevis.* 129. *Dianthus prolifer.* 130. *D. Armeria.* 134. *Silene acaulis.* 138. *S. gallica.* 146. *Lychnis alpina.* 162. *Cerastium alpinum.* 192. *Linum angustifolium.* 199. *Althaea officinalis.* 245. *Trifolium incarnatum.* 247. *T. stellatum.* 253. *T. Bocconi.* 273. *Oxytropis uralensis.* 293. *Lathyrus sylvestris.* 294. *L. palustris.* 311. *Rubus Chamaemorus.* 334. *Pyrus communis.* 337. *P. torminalis.* 352. *Ludwigia palustris.* 364. *Sedum dasyphyllum.* 366. *S. villosum.* 370. *S. reflexum.* 378. *Saxifraga Hirculus.* 382. *S. cernua.* 385. *S. nivalis.* 408. *Trinia vulgaris.* 411. *Carum segetum.* 412. *C. verticillatum.* 420. *Bupleurum aristatum.* 430. *Ligusticum scoticum.* 432. *Meum athamanticum.* 450. *Caucalis daucoides.* 459. *Cornus suecica.* 467. *Lonicera Caprifolium.* 468. *L. Xylosteum.* 480. *Galium tricorne.* 487. *Valeriana pyrenaica.* 501. *Erigeron alpinus.* 502. *E. canadensis.* 508. *Gnaphalium luteo-album.* 510. *G. supinum.* 515. *Inula salicina.* 519. *I. pulicaria.* 520. *Xanthium Strumarium.* 534. *Diotis maritima.* 539. *Artemisia Absinthium.* 549. *Senecio paludosus.* 551. *S. palustris.* 557. *Saussurea alpina.* 610. *Arnoseris pusilla.* 616. *Phyteuma spicatum.* 621. *Campanula Rapunculus.* 634. *Loiseleuria procumbens.* 636. *Menziesia caerulea.* 643. *Pyrola uniflora.* 648. *Monotropa Hypopithys.* 665. *Pinguicula alpina.* 675. *Cicendia pusilla.* 679. *Gentiana nivalis.* 710. *Asperugo procumbens.* 719. *Orobanche caryophyllacea.* 720. *O. rubra.* 721. *O. elatior.* 732. *Antirrhinum majus.* 737. *Linaria supina.* 767. *Bartsia viscosa.* 816. *Teucrium Scordium.* 873. *Polygonum viviparum.* 882. *Hippophae rhamnoides.* 883. *Thesium linophyllum.* 976. *Alisma natans.* 980. *Stratiotes aloides.* 982. *Liparis Loeselii.* 987. *Cephalanthera ensifolia.* 988. *C. rubra.* 992. *Epipogum aphyllum.* 995. *Spiranthes Romanzoviana.* 1008. *Habenaria intacta.* 1030. *Polygonatum verticillatum.* 1039. *Lloydia serotina.* 1045. *Scilla autumnalis.* 1048. *Allium Ampeloprasum.* 1053. *A. vineale.*

MELAMPYRUM PRATENSE L. IN THE DRUCE HERBARIUM.

C. E. Britton.

The Linnean species mentioned comprises mostly shade-loving (seldom growing in full exposure) plants, semi-parasitic in their mode of life, usually occurring socially and marked among themselves by characters that are little taken note of beyond the limits of *Melampyrum* and allied genera of similar parasitic habit. The individual plant has a life duration of but a few months, and one generation only is produced annually. The oblong or spathulate cotyledons appear above the soil, and are usually present in all forms at the commencement of the flowering period, and may still be seen at the conclusion of the flowering period in forms whose growth is strictly limited. If, however, growth is more or less indeterminate, the cotyledons will not be seen late in the season, as they have already fallen or fall in the act of taking the plant from its surroundings. Following the appearance of the cotyledons, the growing stem produces opposite simple elongated leaves, and from the axils of the lower and median leaves branches arise, which may remain rudimentary, may develop to a certain extent bearing leaves only, or may further develop and bear flowers in addition to leaves, or may even bear secondary branches terminating in leaves and flowers. The leaves may be of fairly uniform character, or the uppermost leaves (bracts) accompanying the flowers may be shorter and broader, and either entire or furnished at the base with teeth-like lobes of varying size. The bracts bear one flower each in the axils and the flowers appear in pairs all directed to one side (secund). It is often the case that above the uppermost pair of branches and beneath the lower pair of flowers are one or more pairs of leaves. These are really barren bracts, and under the name of intercalary leaves constitute important characters in descriptions of the various forms. The flowers furnish two features made use of in distinguishing two primary groups of forms (or sub-species). These are (1) the relative lengths of certain anther-spurs and attendant hairs, (2) the ultimate assumption by the corolla of a purplish hue or not. After studying these characters of the flowers in living plants, no conviction of their supreme diagnostic value has been obtained.

Authors who have especially devoted themselves to the study of *Melampyrum* attach importance to features that have less value elsewhere. Such characters are the number and relative distance apart of the stem nodes, the numerical node at which the inflorescence begins, the absence or presence of intercalary leaves, and, when present, the number of pairs of such organs. Botanists who have not paid attention to these matters may be disposed to attribute little value to characters founded upon these features, but, for my own part, I have been impressed by the dependence to be placed upon certain of these characters, e.g., the number of pairs of intercalary leaves, although it is necessary that a series of a form from a given locality should be examined to arrive at a satisfactory conclusion, observation of an individual plant being inadequate or even misleading.

The early native observers appear to have been little acquainted with the diversity of forms presented by *Melampyrum pratense.* One form, however, that attracted attention was *Melampyrum latifolium flore albo labio inferiore duabus maculis luteis distincto* recorded from a Yorkshire wood near the residence of Dr Richardson at North Bierley. This deviation, dismissed by Smith as differing only in its paler flowers, finds no special mention in F. A. Lees' *Flora of West Yorks*, although the locality is cited for *M. pratense.* The first British botanist to give particular attention to this Cow-wheat was Johnston, who in the *Flora of Berwick-upon-Tweed* (1829) described a new species, *M. montanum*, in addition to the usual *M. pratense.* After an interval of more than 20 years the youthful Daniel Oliver described in the pages of the *Phytologist* (1852) a plant from the west of Ireland which he distinguished as var. *ericetorum.* To the descriptions of both the preceding forms, Syme, in 1866, added those of vars. *vulgaris* and *latifolia.* In 1884 the late Dr G. C. Druce made a notable contribution to the knowledge of *M. pratense* by describing his var. *hians*, adjudged at the time by certain contemporary botanists to be of very little value, but a form whose importance has been recognised by subsequent monographers. Small plants, with more or less purplish flowers, from the Scottish Highlands, were considered by the late Arthur Bennett, in 1896, to be identical with the Scandinavian variety *purpureum.* In the Report for 1917 of the Botanical Society and Exchange Club (vol. v, part 1, 1918) Druce made known the numerous additional varieties, sub-varieties, and forms occurring in Britain on the faith of their mention in Beauverd's monograph of the genus *Melampyrum* (1916). The monographer's knowledge of the British forms was derived from a study of the material from the collections of Druce, consisting of about 100 mounted sheets, each usually representing gatherings from three or four localities. As all now bear Beauverd's own identifications, they are of extreme importance in the study of the forms inhabiting Britain, and for the opportunity of consulting this rich collection I am indebted to Mr John Chapple, curator of the Druce Herbarium, and to the Trustees of the late Dr Druce.

As there does not exist in the English language any account of the forms of *M. pratense* derived primarily from a study of the plants, the descriptions that follow have been drawn up from the material referred to. It is true that Druce (*l.c.*) gave brief descriptions of most forms, but these were derived from the Monograph. The arrangement of the native forms given by Druce in the Report referred to was also adopted in the two editions of the *British Plant List*, and closely followed by Salmon in the 11th ed. of the *London Catalogue of British Plants.* In some few cases I have ventured to depart from the views of these botanists.

Var. TYPICUM G. Beck, Fl. Nieder-Oesterr., ii, 1070 (1891); Beauverd, Monogr., 480, 488.

Plant c. 24 cm. Stem fairly stout, naked below, branched at the middle, goniotrichous, hairs reflexed; branches naked below, leafy at apex, goniotrichous, non-flowering. Cotyledons persistent or deciduous, oblong-spathulate, 25 × 6 mm. Cauline leaves 1 pair, spreading, scabrid, 35 × 2.5 mm.; intercalary leaves 0. Inflorescence commencing at 2nd or 3rd node; bracts scabrid, the lower, entire, linear-lanceolate, 35 × 4 mm., the upper bracts similar, the apical smaller, bidentate at base; flowers c. 15 mm., calyx-tube 2 mm., teeth c. 2 mm. erect or recurved.

Ireland: Clogher Valley, Co. Tyrone (C. L. Peck). Represented in *Herb. Druce* by two specimens only, which are annotated "*Melampyrum pratense*, ssp. *eu-pratense*, var. *typicum* Beck (f. *luteum* Blytt?), vid. Beauverd, 1916." In the Monograph these Irish specimens are cited under sub-var. *foliatum* Neum. in *Sveriges Flora*, 150 (1901), together with plants from Graffham, Sussex, communicated by the late C. C. Lacaita, which are described as a f. nov. *laxum* and distinguished by its drawn-out habit (internodes 40-100 mm.), larger leaves, and inflorescence commencing at the 4th node

There appears to be but little to separate var. *typicum* and sub-var. *foliatum*. In the former the branches arising at the lower node are obliquely-erect, sterile, or bear but few flowers, the inflorescence commences at the 3rd node (seldom at the 2nd or 4th), the intercalary leaves are usually absent, rarely is there one pair. In the sub-var. the branches terminate with leaves and flowers, and in length equal the stem, the inflorescence commences at the 2nd or 3rd node and intercalary leaves are absent.

Var. ALPESTRE Beauv. in Bull. Soc. Bot. Genève, 2nd ser., iii (1911), 312; Beauverd Monogr., 480, 486.

Plant usually 8-10, rarely reaching 20 cm. Stem erect or inclined, simple or branched, goniotrichous; branches simple and sterile, erect, or floriferous and patent or ascending. Cotyledons persistent or deciduous, spathulate-oblong, 15-20 × 3-5 mm. Cauline leaves 1 or 2 pairs, lanceolate-linear, shortly-petioled, erect or spreading, 25-40 × 2-3 mm., scabrid; intercalary leaves 0 or 1-2 pairs, erect, resembling the cauline leaves, scabrid. Inflorescence commencing at 2nd-4th nodes; lower bracts lanceolate-linear, entire, 25-40 × 2-2.5 mm., upper bracts decreasing in size, entire, or with a few distant teeth below, all scabrid; calyx-tube 2 mm.; teeth 4 mm. setaceous, upper recurved-erect; scabrid; corolla 14 mm.

In small plants the stems are unbranched or with short sterile branches from the lower nodes; the elongated bracts stand erect above the clustered parti-coloured flowers.

The British plant is sub-var. *scotianum* Beauv., *l.c.* 480, 486, and is an endemic form differing from sub-var. *eu-alpestre* Beauv. in the less distant lower nodes and the rather thick scabrid leaves. In sub-var. *eu-alpestre* the internodes are elongated (30 mm. or more) and the stem-leaves are thin and glabrous.

First found in Ireland early in the 19th century, later gathered on Mangerton by W. J. Blake in 1844. Found in the Hebrides by W. S. Duncan in 1896 and identified by Arthur Bennett with *M. pratense* L., var. *purpureum* Hartm. Under the latter name distributed by Messrs Wheldon & Wilson in 1909 through the Bot. Exch. Club.

Habitat: Associated with *Erica, Sphagnum*, etc., on northern moorlands and mountains ascending to 3000 ft.

Distribution: v.-c. 68, 88, 92, 96, 97, 108, 110.

Obs.: The plant when growing has attracted the attention of collectors by reason of the bright colouring of the flowers, which are described as " tipped with a rich purple or magenta " or to have " a marginal band of deep carmine, throat of a rich yellow, and tube very pale yellow." Confirmation and further details are desirable.

Var. PALUDOSUM Gaudin, sub-var. EU-PALUDOSUM Beauv., *l.c.*, 480. 489.

In the Monograph two British localities are cited under this: (1) Inch Garth (No. 775 in Herb. Druce), and (2) Wybunbury, Cheshire, viii, 1906, leg. G. C. Druce (No. 1960 in Herb. Druce!). No. 775 consists of three plants labelled *Melampyrum pratense* L. ? var. *ericetorum* D. Oliv. collected by the late W. A. Shoolbred on the 6/7/13. There is also a second sheet of specimens of the same gathering in the Druce Herbarium, and all were received through the Bot. Exch. Club. Salmon, who was present when the plants were gathered, suggested the varietal name, with the observation that the specimens were closely allied to var. *montanum*. The late Arthur Bennett was also inclined to refer the form to var. *ericetorum* though shading off to var. *montanum*. More recently Salmon's specimens collected at the same time and place as Dr Shoolbred's have been referred by Dr R. v. Soó to var. *ericetorum*. I endorse these conclusions and would also place under var. *ericetorum* specimens in Herb. Druce from Coshieville, M. Perth, collected in August 1915 and labelled *M. pratense*, var. *paludosum*, with the remark on one sheet, " Salmon's *ericetorum*." As to the *Melampyrum* from Wybunbury, that is a form which has repeatedly attracted the attention of collectors and more than once has been distributed through the Bot. Exch. Club. In Herb. Druce are examples collected by Marshall in 1895, by Wolley-Dod in 1899, and by Druce in 1906 and in 1915 (?). With the exception of Marshall's gathering, which consists of small slender plants about 13 cm. in height, with entire bracts (consequently referred to var. *montanum* by Messrs H. & J. Groves) the remainder of the gatherings are fairly uniform. Now, of these, Beauverd referred Wolley-Dod's plants to " *M. pratense*, ssp. *eu-pratense*, var. *ericetorum ad var. montanum vergens*," and Druce's plants of 1906 to " *M. pratense* L., var. *paludosum* Gaudin, sub-var. *eu-paludosum* Beauv."

After studying the various gatherings from Wybunbury, I am compelled to adopt the conclusions that one form only occurs there, *i.e.*, var. *ericetorum* D. Oliver, and that var. *paludosum* in any form has not been established as a British plant. Soó has also referred Marshall's plant of 1895 to var. *ericetorum* D. Oliv.

Var. MONTANUM Hook., Brit. Flora (1830), p. 285. *M. montanum* Johnston, Fl. of Berwick-upon-Tweed, i. 136 (1829); Beauverd, *l.c.*, 481, 493.

Plant c. 10-20 cm. Stem simple or branched from below, goniotrichous, nodes 5-10 mm. distant; branches leafy, obliquely erect, 5-10 cm., equalling or exceeding the stem, floriferous. Cotyledons persistent or deciduous, oblong-spathulate, 16 × 3 mm. Cauline leaves linear, spreading or sub-erect, scabrid, 25 × 2 mm.; intercalary leaves 1-3 pairs, lanceolate-linear, erect-spreading, scabrid, 20 × 2 mm. Inflorescence commencing at 4th to 8th node, bracts spreading or sub-erect, scabrid, linear or linear-lanceolate, the lower entire 15-20 × 2 mm., the upper smaller, bidentate or 4-toothed at base. Flowers 12 mm., calyx-tube 2 mm., teeth 3 mm.

Habitat: Elevated moorlands and woods in mountainous districts.

Distribution: British Isles. Endemic. Details of distribution imperfectly known owing to forms of var. *ericetorum* D. Oliv. being mistaken for var. *montanum*. These two varieties appear linked together by intermediate forms, and are also both closely connected with var. *alpestre*. To the latter should probably be referred the var. *montanum* from Strath Bagaisteach mentioned in the Monograph. The collector noted that the lip was deep orange, recurved, with bright lake-coloured lines round other portions of flower.

Var. ERICETORUM D. Oliver in Phytologist, 1852, 678; Beauverd, *l.c.*, 481, 493.

Plant 22-30 cm. Stem erect or inclined, nodes 15-35 mm. distant, branched from the base, glabrous or goniotrichous, branches spreading, ascending or sub-erect, almost equalling the stem, all flowering or the lower arrested. Cotyledons deciduous or persistent till dispersal of seed, oval-spathulate, 16 × 6 mm. Cauline leaves spreading or declining, linear-lanceolate, scabrid, 35-40 × 4-5 mm.; intercalary leaves 0 or 1-2 pairs, linear-lanceolate, scabrid, 40 × 5 mm. Inflorescence commencing at 4th to 6th node, lower bracts linear-lanceolate or lanceolate, rounded at the base, entire, scabrid, c. 35 × 6 mm., intermediate bracts linear-lanceolate, hastate at the base, or with 2-3 pairs of subulate teeth and elongated sub-falcate limb; flowers c. 13 mm. in somewhat distant pairs, calyx-tube 2 mm., teeth 3-4 mm.

Habitat: Moorlands, associated with *Erica*, *Calluna*, *Vaccinium Myrtillus*, etc. Also on sunny borders of woods. Appears to favour localities situated on the Palaeozoic and Mesozoic formations and to be absent from the Tertiary deposits.

Distribution : Chiefly in the western and northern regions of Britain but reaching the southern counties (Hants and Surrey). Ireland.

Var. BRITANNICUM Beauverd, *l.c.*, 482, 497.

Plant 15-28 cm. Stem erect, c. 1 mm. diam., nodes 30-50 mm. distant, branched, branches remote, divergent or ascending 10-12 cm. long, naked below, leafy and floriferous at apex. Cauline leaves spreading or ascending, linear-lanceolate, 60 × 6 mm., intercalary leaves 0-1 pair, similar to cauline leaves. Inflorescence commencing at 4th node, lower bracts lanceolate-linear, entire, 70 × 8 mm., intermediate bracts lanceolate-linear, hastate at base, 55 × 8 mm., upper bracts much smaller, pectinate-palmatifid. Flowers 15 mm., calyx-tube 2 mm., teeth subulate, 2 mm.

Endemic. The preceding description is based upon a plant from Alton, N. Hants, coll. G. C. Druce. Other plants also named var. *britannicum* by Beauverd are one from Sligachan, Skye, and two from Brockenhurst, S. Hants, coll. C. E. Palmer. The latter are notable for the greater breadth of the bracts as compared with the narrowly linear leaves of the branches, which are again branched. The plants are noted as going off towards var. *oligocladum* Beauv.

Var. COMMUTATUM (Tausch) Beck Fl. Nieder-Oesterr., ii, 1069 (1893); Beauverd, *l.c.*, 482, 498. Sub-var. CONCOLOR Schönheit; Beauv., *l.c.*, 482, 500.

Recorded by Beauverd in the Monograph from " Bagley Wood (?) anno ? leg. Baxter (in Herb. Druce sub-var. *montano* !)." Baxter's plant is annotated by Beauverd " *Melampyrum pratense*, ssp. *vulgatum* Tausch, sub-var. *verum* Beauv." Two portions exist, each the upper part of a stem or branch, one, flowering, the other with fruit. The specimens are notable for the elongated linear or setaceous lateral lobes of the upper bracts. Herb. Druce also contains upper portions of a large plant referred without reservation to var. *commutatum*, sub-var. *concolor*. It originated at Upton Wood, Warwick, and is distinguished by four pairs of elliptical-lanceolate intercalary leaves, c. 60 × 15 mm. The lower bracts are entire, succeeding bracts hastate, uppermost palmatifid with narrow lobes. A third plant from Silverdale, Lancs, is referred to var. *commutatum* Tausch, sub-var. *concolor* " vel sub-v. nov. aff. *concolori* ? (area britannica !)."

It will be seen from these notes that Herb. Druce affords little material helpful to an understanding of this var. and sub-var.

Var. BREVIDENTATUM Beauverd = M. PRATENSE, var. BREVIDENTATUM Beauverd in Bull. Soc. Bot. Genève, iv (1912), 429. Monogr., 483, 497.

Stem erect, 23-25 cm. in height, 1 mm. in diameter, nodes remote (35-45 mm.), branched from the base, lowest branches short, sterile, upper branches erect-ascending, again branched, flowering at apex.

Cotyledons persistent, oblong-spathulate, 15 × 2 mm. Cauline leaves linear-lanceolate c. 40 × 4 mm.; intercalary leaves 2 pairs, similar to cauline leaves. Inflorescence commencing at 6th node, bracts entire, the lower lanceolate, 40 × 4.5 mm., the upper smaller falcate. Flowers —? Plants with immature and dehisced capsules only.

The foregoing description is based upon two plants enclosed in the "d. *brevidentatum* (Beauv.)" cover in Herb. Druce. To one is attached a label with the pencilled words "*Melampyrum sylvaticum*, Loch Lomond, 12/8/13, Alfred Webster." To the locality, the word "Tarbet" has been added, and "*sylvaticum*" crossed out in ink and "*pratense brevidentatum*" substituted together with the numerals 2887. The second plant likewise bears the numerals mentioned with the same particulars of locality and year of collecting. Under these is written in pencil "*M. pratense*, ssp. ? *vulgatum*, sub-var. *brevidentatum*." Although the last words are not followed by a signature, I do not entertain doubt that they were written by the late G. Beauverd, although his notes otherwise are invariably in ink and signed. These particulars have been given in detail as I do not feel satisfied that the labels refer to the plants with which they are associated. In the first place the var. is characterised as "*Herba monticola perpusilla*" and is described as reaching a height of c. 12 cm., with the lower bracts entire or dentate, and the succeeding bracts furnished with two pairs of somewhat distant large curved teeth. The inflorescence beginning at the 4th to 6th node, rarely at the 3rd, the upper calyx-teeth 1.5 mm. long.

It will be seen that the Loch Lomond plants differ essentially in their larger stature and entire bracts, and for these reasons alone do not seem referable to var. *brevidentatum*. They are as likely as not to belong to var. *hians* Druce.

Var. VULGATUM (Pers.) Beck, Fl. Nieder-Oesterr., ii, 1069 (1893), Sub-var. LAURIFOLIUM Beauv., Monogr., 483, 507.

Growth lax. Stem stout, 20-40 cm. in height, 2 mm. in diam., nodes 20-40 mm. distant; branches numerous, ascending or divergent, flowering. Cotyledons present when first flowers expand, oblong-oblanceolate, 20 × 5 mm. Cauline leaves shortly petioled, oblong-lanceolate, or elliptical-lanceolate, base rounded, acuminate, 50-70 × 12-20 mm.; intercalary leaves (usually 1 pair) and lower entire bracts, 70-100 × 18-23 mm., similar to cauline leaves, succeeding bracts decreasing in size, with 1-2 pairs of basal teeth, upper bracts smaller and palmatifid. Inflorescence commencing at 4th or 5th node, flowers 13-15 mm., calyx-tube 2 mm., teeth 4 mm.

Distribution: England. Endemic. Wootton-under-edge, Glos.; Oaresbury, Berks.; Brickhill, Beds.; Rotherfield, Oxon; Brecon, etc.

Obs.: Not always easily separated from vars. *lanceolatum* Spenn. and *ovatum* Spenn., but, in general, the elongated broad leaves and bracts distinguish it from both.

Var. VULGATUM Beck, *l.c.*, sub-var. DIGITATUM (Schur); Beauverd, Monogr., 483, 507.

There are not any examples of this sub-var. in Herb. Druce that have been so determined by Beauverd without qualification. One of two sheets exhibits the upper part of what must have been a very large plant. It is chiefly in the fruiting stage with the terminal parts of the axes bearing ten or more pairs of markedly palmatifid bracts with narrow elongated acuminate lobes. The lowest bracts are deltoid-lanceolate and the cauline leaves are narrowly lanceolate. The second sheet displays examples of a much reduced form likewise with prominent palmatifid upper bracts and with ovate-lanceolate lower bracts. Both sheets are annotated "*Melampyrum pratense*, ssp. *vulgatum*, sub-var. *digitatum* Schur, f. ad formam *ovatum* Spenn. ± vergens! G. Beauverd."

Distribution: England. v.-c. 11, S. Hants (New Forest); v.-c. 16, West Kent (Wrotham).

Var. OVATUM Spenner, Fl. Frib., ii (1826), 367. M. PRATENSE, ssp. VULGATUM (Pers.) Beck, sub-var. DIGITATUM (Schur) Beauv., forma OVATUM (Spenn.) Beauv., *l.c.*, 483, 509.

Stem stout, erect, goniotrichous, 2 mm. diam.; nodes 40-60 mm. distant, branched; branches erect or sub-erect, equalling or exceeding stem. Cotyledons deciduous. Cauline leaves lanceolate or ovate-lanceolate, acuminate, scabrid, 50 × 18 mm.; intercalary leaves 1 pair, ovate-lanceolate, scabrid, 50 × 20 mm. Inflorescence beginning at 5th or 6th node, lower bracts entire, ovate-lanceolate, sub-cordate at base, 50 × 23 mm., intermediate bracts ovate-lanceolate, 35 × 12 mm., with two pairs of basal diverging teeth, upper bracts palmatifid with slender spreading lobes, shorter than the flowers. Flowers 12-16 mm., calyx-tube 2 mm., teeth 4 mm.

Habitat: Oak-hazel-ash coppices and woods on calcareous soils.

Distribution: England. v.-c. 6, North Somerset (Roper); v.-c. 17, Surrey!; v.-c. 28, Norfolk (Robinson); v.-c. 23, Oxford (Druce!), etc. Ireland. Wicklow (Beauverd).

Obs.: A very striking-looking plant when well-developed, but at times showing strong affinities with var. *lanceolatum* and sub-var. *laurifolium*. Distinguished from the latter by shorter and broader-based leaves with a more distinct tendency to an ovate form.

Var. LANCEOLATUM Spenner, *l.c.* M. PRATENSE, ssp. VULGATUM (Pers.) Beck, sub-var. DIGITATUM (Schur) Beauv., forma LANCEOLATUM (Spenn.) Beauv., *l.c.*, 483, 510.

Growth often lax. Stem stout, 1-1.5 mm. diam., 25-35 cm. in height, erect, often secund at summit, branched, branches ascending in flower, often widely divergent later, all flowering. Cotyledons present at commencement of flowering period, later deciduous. Cauline leaves linear-lanceolate acuminate, 25-80 × 4-10 mm.; intercalary leaves 0 or 1-2 pairs similar to cauline leaves. Inflorescence beginning at 5th or

6th node; lower bracts entire, similar to cauline leaves, succeeding bracts smaller, pectinate at base, uppermost palmatifid, lobes spreading slender. Flowers 14-15 mm., calyx-tube 2 mm., teeth 3 mm.

Habitat: An occasional element in the ground flora of Oak-hazel-birch woods and copses on loam, clay (including clay-with-flints) and sandy soils (Lower Greensand, etc.).

Distribution: Widely spread in the British Isles, and the form of *M. pratense* most frequently met with.

Var. HIANS Druce in Naturalist, 1884, p. 35; Beauverd, *l.c.*, 484. 504.

Plant about 20-30 cm. Stem erect, 1 mm. diam., nodes 20-50 mm. distant, branched; branches originating at lower nodes frequently arrested, upper branches erect or erect-ascending, equalling the stem, flowering, secondary branches sterile. Cotyledons sub-persistent or deciduous, oblong-spathulate, 20 × 4 mm. Cauline leaves linear-lanceolate, 40 × 5 mm., lamina cuneate at base and appearing longer-petioled than in related forms; intercalary leaves similar to cauline leaves, 0-1-2 pairs. Inflorescence beginning at 3rd. 4th, or 5th node; lower bracts entire, lanceolate, 40 × 6 mm., succeeding bracts decreasing in size, entire, bidentate, or pectinate at base, upper bracts seldom palmatifid, usually with elongated narrow limb and 1-2 pairs of ascending teeth. Pairs of flowers usually spaced. Flowers 15 mm , calyx-tube 2.5 mm., teeth 5 mm.

Habitat: Umbrageous rocky situations.

Distribution: Apparently confined to the northern and western districts of Britain where the rocks of the Archaean and Palaeozoic systems prevail. Appears to be absent from those regions where the Secondary, Tertiary, and post-Tertiary formations occupy the surface. Its distribution does not appear dependent upon the amount of the annual rainfall.

As is well-known, var. *hians* is notable for its uniformly golden yellow (or deep yellow verging on orange) corolla, which is erect rather than spreading, and with the mouth always distinctly open. The leaves vary considerably in width, and two forms were recognised by Beauverd.

Forma *stenophyllum* Beauverd, *l.c.* Stem flexuose, leaves linear-lanceolate, inflorescence beginning at 4th or 5th node. bracts mostly entire, uppermost only hastate or pectinate at base.

Forma *platyphyllum* Beauverd, *l.c.* Stem stout, erect, leaves ovate-lanceolate. upper bracts conspicuously pectinate at base.

The broad-leaved plants that Druce named *Melampyrum pratense* L. agg., var. *hibernicum*, in *Report Bot. Soc. and Exch. Club Br. Isles*, iv, part iii (1915), p. 205—" The Southern *hians* " appear to be only separable from f. *platyphyllum* by reason of the distant basal teeth of the upper bracts. It is known from Millook, Cornwall, and from several localities in Ireland.

Var. INTEGERRIMUM Döll, Fl. des Grossherzogt. Baden (1857), 703. MELAMPYRUM PRATENSE, ssp. VULGATUM Pers., var. INTEGERRIMUM Döll, f. PSEUDO-SILVATICUM (Schur) Beauv., *l.c.*, 484, 517.

Stem erect, 20-40 cm., 1 mm. diam., nodes 25-35 mm. distant, branched from the base, glabrous or goniotrichous, lower branches arrested and median branches only developing, or all branches lengthening, and bearing secondary branches and flowers. Cotyledons deciduous before flowers expand. Cauline leaves linear-lanceolate, spreading or ascending, 35 × 5 mm.; intercalary leaves 1-2 pairs, linear-lanceolate, 40-50 × 7 mm. Inflorescence begins at 4th to 8th node, lower bracts linear-lanceolate, entire, 50 × 8 mm., upper bracts smaller, entire, or inconspicuously bidentate at base; flowers 15-17 mm., calyx tube 3 mm., teeth 5 mm.

Distribution: Southern England (Hants and Herts), Northumberland, and Aberdeen.

NOTES.

(1) Where the writer has personal knowledge, an attempt has been made to give particulars of the ecological conditions (including geological formations) under which the various forms occur. Little appears to be known in this connection, and it is a subject recommended to the notice of collectors.

(2) In giving details of distribution, material outside the Druce Herbarium has been made use of.

(3) Druce, following Beauverd, applied the term *digitate* to denote the deeply-divided linear-lobed upper bracts. As, however, British usage restricts digitate to *compound* organs, I have uniformly made use of the more correct terms *palmatifid* or *palmatipartite*.

MINTS IN GOWER.

A. L. Still.

Any excuse is good enough for a visit to Gower. I first made the acquaintance of that delightful country some thirty-eight years ago. At that time my knowledge of the sea-board was confined to the South coast of England; and when I first walked from the Mumbles to Langland Bay I thought I had never seen such a beautiful piece of coast scenery. When, later on, my rambles extended as far as the Worm's Head, I was sure of it. The Mountain Limestone forms a succession of finely-carved cliffs and bays, contrasting with the inland ridges of Old Red Sandstone and conglomerate covered with heath and bracken. Surface water is abundant, but water at depth not too plentiful. This fact, combined with the large area of common land, has kept the builder at bay, so that the district remains even now mostly unspoiled. When I first knew Gower the only means of getting to the end of it was by taking a pair-horse 'bus which left Swansea in the afternoon and took three or four hours on the road. To get back one had to catch it at 5 or 6 in the morning. Now a good service of motor 'buses is available. In those days my interests were centred in the abundant and varied flora and fauna of the rock-pools and I did no intensive botanising. But I remembered seeing several kinds of Mint at Llangennith, and when my attention was diverted to that Genus I thought I must go back and look them up. The excuse for doing so was provided by an invasion of house-decorators threatening to make the house uninhabitable, so on August 8th we migrated to the King Arthur Hotel, Reynoldston. This is a good centre, as the 'buses to all parts of Gower pass through the village. I had stayed there once before in 1896, when I walked with a friend all round the coast from Three Cliffs Bay to Llangennith during an Easter holiday. Now to work!

Reynoldston itself yielded only common forms of *M. arvensis* and *M. verticillata* in addition to *M. Pulegium*. Thursday, August 9th, opened wild and stormy-looking, but I made the attempt on the Worm's Head, and the day cleared up. This visit yielded *Inula crithmoides*, *Limonium binervosum* and sundry *Atriplex* forms, and incidentally enabled me to look up an old friend with whom I used to stay in the early days, the only one who remembered me. Friday, the 10th, was too wet to get far. In the afternoon things looked better, and I started for Oxwich Burrows to get *Limonium vulgare* and the Sea Rushes or whatever else might turn up. A wild afternoon with pouring rain rather spoilt things, but I did find the rarest object of all my quests—a motorist who offered me a lift! Wet as I was, encumbered with mac, pack and vasculum—to say nothing of soaking umbrella—he insisted on my squeezing into the front seat of his van with himself and his wife and took me up the steep narrow hill to Nicholston Towers, where our roads diverged. The other drivers who passed me on Oxwich Marsh had contented themselves with splashing the puddles over my feet, already thoroughly wet. Having found the "sundries" which I wanted, Saturday, the 11th, was free for the Llangennith Mints. The first find was a rather dried-up colony of *M. rotundifolia* under the churchyard wall. Down the lane to Coity Green, things began to move. *M. piperita*, var. *subcordata*, and *M. rubra* grew luxuriantly along the stream, while the soft green leaves of *M. gentilis* covered the other bank of the lane. Around the bushes just on the Green was a colony of *M. verticillata*, which Mr Fraser considers the Linnean type—a very branched slight plant with rather small leaves and covered with flowers. I have seen it nowhere else; but among Dr Druce's plants at Oxford there are similar plants labelled var. *elata*. It is an attractive plant. On the Green itself, *M. gentilis* was plentiful, just coming into flower. *M. aquatica*, the common *capitata* form, grew in the stream, and also a fine colony of *M. spicata* which I remember seeing many years ago. *M. rubra* and the Peppermint were all about the Green. Returning to the village, I renewed acquaintance with its narrow ways and found a great quantity of the same form of *M. gentilis*. Mr Fraser is inclined to accept this as var. *Pauliana* F. Schultz, the sub-glabrous form, with long hairs on the calyx-teeth. The vasculum showing signs of repletion I returned to Reynoldston and got busy with the press. On Sunday the morning was stormy, but the day cleared and as no 'bus was available we took a car to Llanrhidian, and walked the new by-pass road to the Common. Here a little bank yielded *M. piperita*, var. *subcordata*, *M. spicata*, *M. arvensis*, var. *agrestis*, and a form of *M. verticillata* which Mr Fraser assigns, on the technical characters, to var. *rivalis*, but which seems to me a very distinct plant which at present cannot be put under any variety and requires further study. I have since had it sent from the Bishopston Valley, though I missed it on my visit there. Down on Llanrhidian Marsh the Marsh Mallow covered acres of ground, a beautiful sight. Monday, the 13th, was a lovely day, so we drove to Llanmadoc. My object here was to search for *Blysmus rufus* at Miss Vachell's request, and also to see if I could run across *Eleocharis uniglumis*, which has been recorded there. Cwm Ivy Marsh is a big place and I spent an hour or so there, but could not find either plant. It was, of course, rather late in the season. *M. aquatica* was abundant on the Marsh and a curious dwarfed and congested form of it on Whitford Burrows close by. Here also occurred *Viola Curtisii*, *Juncus acutus*, and some interesting *Rubi*, one like a Dewberry with large black fruit, all the drupes being developed. As there seemed to be no prospect of any good Mints there, I decided to walk round the shore to Llangennith from the North side, quite new ground. I went down through the village to the Mill, noting by the way *Marrubium vulgare* and more of the Mints already seen. By the road to the Mill a group of small Mints caught my eye and I took two or three plants thinking I had an *arvensis* form not previously seen.

When I got home and was going through my plants with Mr E. C. Wallace he said, "Surely that is *M. cardiaca.*" This proved to be correct, and a new county record. Probably this group is a survival of cultivation from the ancient monastic foundation of which the memory survives in the name of College Farm. Tuesday, the 14th, was devoted to Parkhill and the Bishopston Valley, both beauty spots. The task before me was first to confirm, if possible, records of *M. rotundifolia*, var. *Bauhini*, and *M. gentilis*, var. *Pauliana*—the latter by E. F. Linton. The first presented no difficulty, the plant being plentiful by the roadside and also forming a good block in the turf by the tidal stream flowing past Pennard Castle. The *M. gentilis* was a more difficult proposition. I searched all down the East bank of the stream, round the trickles draining the Burrows, but got only *M. verticillata*, var. *paludosa*, and *M. arvensis*, var. *densifoliata*. Crossing the stepping stones down near the seashore and working up the West bank of the stream and round the marshy ground under the woods I found plenty of *M. aquatica*, a little *M. rubra*, and—as mentioned above—*M. rotundifolia*, but no *M. gentilis*. On the way back to the road, a small patch of Mint by the meadow-path seemed unfamiliar, so was raided for a few specimens. Walking up the road to the Gower Inn the same plant showed up, but the vasculum was getting full and I had the Valley yet to do, so none was gathered. It is in the nature of things that this should now turn out to be the most important Mint of the whole series gathered. It is *M. verticillata*, var. *trichodes* Briquet, a plant hitherto only known in this country from a single very poor example gathered by the late Dr Druce in Hereford about 1894. Miss Vachell has kindly gathered and sent me further material, but this was a month later, and the specimens consequently rather past their best stage. Reaching the Bishopston valley, *M. rotundifolia*, the sub-glabrous form sometimes called var. *Bauhini*, was again in evidence and very fine. Here also *M. gentilis* again showed up but a very different form from that found at Llangennith, decidedly hairy and with deep acute serratures. I have seen similar plants from Cornwall collected by Davey and others and named by A. Bennett var. *Pauliana* Schultz. A. B. must have based this name solely on the long hairs on the calyx-teeth, for the plant does not agree in any other respect with the description of Schultz nor with his specimens at Kew. I believe, however, that Linton's plant from "Pennard Castle" is the same as the Llangennith *M. gentilis*, although his specimen is not in a good stage for comparison. There were other Mints mixed with the *M. gentilis* in the Valley but I did not take as much notice of them as I should have done if I had not already got more than could be properly dealt with. Since then I have had more material sent me and this included not only the *M. gentilis*, but *M. verticillata*, var. *trichodes*, and the doubtful form found at Llanrhidian, both very welcome additions. Wednesday, the 15th, was devoted to Blackhills and Fairwood Common. Here again I failed to find the recorded *M. gentilis*, much to my regret. However, *M. spicata*, *M. verticillata*, var. *adulterina*, and *Bartsia viscosa* were compensations. I had taken the 'bus intending to complete the search on Oxwich Marsh and in the village, but the conductor, a bit of a botanist, told me a tale of the wealth of Mints at Overton, so I rode on there—a regrettable decision, as all I saw was heavily slashed growths of *M. rubra*. However, I had a chat about old times with a relative of a very gallant man, the late Billy Gibbs, coxswain of the Port Eynon lifeboat, whom I remember well before he was lost in a desperate attempt to rescue the crew of a wreck. Thursday, the 16th, was my last day, and I went again to Llangennith to gather fresh material of the Peppermint and *M. rubra*, which were not well in flower on my first visit, and also more *M. gentilis*, of which I wanted enough for distribution. On Friday we returned to Surrey, where we found the house swept and garnished, but, fortunately, not empty. It had been a most enjoyable trip, and I was glad to have been able to make some fresh records. My only regret is that I had no company on my rambles, and, of course, could only cover a small part of the district. Readers may have noticed that no mention has been made of any find of *M. longifolia* or its hybrids. This group seems to be absent from Gower, save for a record of *M. alopecuroides* at Llanmadoc, which I had no time to verify. I must here gratefully acknowledge the help I have received from Miss E. Vachell, of Cardiff, both in giving me information about previous records and in collecting and sending me material. Dr Esther Bowen, of Swansea, was also kind enough to collect and send me useful material from Bishopston, while Mr Fraser has kindly examined and annotated my whole gatherings of Mints. Miss Howell, of the King Arthur Hotel, a lady universally known and esteemed in that part of the world, made us very comfortable and gave me every facility for drying papers, most necessary in that rather humid climate. The people of Gower are as friendly as ever, although I missed many faces of which I have most pleasant memories. I hope these notes may be of interest to some at least of my fellow-members. They would not have been written without the encouragement of our Secretary. An apology is due for their somewhat egotistical tone, but that is a defect inseparable from an account of a solitary expedition.

Wallington, Surrey, December 1934.

AN ORNITHOLOGIST'S CONTRIBUTION TO THE PROBLEM OF PLANT DISTRIBUTION.

GEORGE W. TEMPERLEY.

In a recent paper entitled "Possible Glacial Survivals in our Flora" (*Trans. Northern Naturalists' Union*, vol. i, pp. 30-36) Dr K. B. Blackburn has very ably reviewed the evidence which our Arctic-alpine plants provide for a belief that a few mountain areas, in particular certain portions of the Upper Teesdale moorlands, were preserved as nunataks —ice-free patches amongst the otherwise ubiquitous glacier sheets— during the last Glacial Period. In support of the contention that these Arctic-alpine plants are indeed a relict flora from Glacial times, Dr Blackburn gives details of the present distribution of many of them. In so doing she mentions one species after another whose distribution can only fittingly be described as "freakish." Several plants occur at one single station only in the whole of the British Isles; others occur at two or perhaps three widely distant ones; while others again, native to the Highlands of Scotland, have an odd outlier in England or Wales. The botanist, supported by the glacial geologist, asks one to believe that these plants are the last remaining specimens of a once more widely spread flora, native to these Islands during the last Glacial Period; that, as the climate changed, they became stranded on mountain tops, like the Ark on Ararat, where they have been ever since.

The more one studies these plants in the field the less is one able to believe that their present isolated stations can be taken as an indication that they have occupied them for any considerable period of time. To the writer it seems much more probable that they have only recently arrived and have, as yet, failed to spread, than that they have once been plentiful and are now exterminated in all but a few freakish fastnesses. Let us examine two or three of them.

On a few perpendicular inches of unscalable precipice amongst the Snowdon ranges have been found a few plants of *Lloydia serotina*, the Spiderwort. Close at hand, acres of similar crags abound and further afield are many square miles of crags in Lakeland and the Highlands of Scotland—but on none of these does *Lloydia* grow. Its nearest homes are the Alps and Northern Siberia. The position which this plant occupies is just such as one would expect it to do if it had only recently arrived upon the scene. Its foothold is very restricted. It has not yet had time to spread horizontally along the crags. One would not expect it to do so readily. Its seeds are heavy and naturally tend to fall vertically. That it is being propagated by seed is shown by the fact that in the crevices below the adult plants are many small seedlings—some of the cracks are lined with them. When they reach the base of the crags no doubt the sheep prevent their further progress, should a "collector" fail to secure them. The chances of the seeds being conveyed horizontally along the crags are small indeed—but the plants are on at least three separate rock-faces already, so it is at least possible.

Another curious distribution is that of *Lychnis alpina*, the Alpine Campion, whose sole British stations are one mountain in Scotland and a certain steep gully in Lakeland. A visit to its Lakeland station shows that the plant is well established in the one long, narrow gully. The rocks on one side of the scree which fills the "rake" are studded with plants—old plants, young plants and seedlings. It is evidently quite capable of propagating itself. It is a plant with a heavy seed. It can therefore spread down the gully, but it cannot readily escape round the corner to the next suitable and safe habitat. Above is turf, below is scree, and the sheep attend to any plants which may stray thereon. The impression one receives is that the colony is a young one. Given more time, fewer sheep and, in these days, fewer amateur gardeners, it might spread elsewhere. From its appearance one would never conclude that this is the last remaining stronghold of a plant which has vanished from every other English and Welsh mountain and from all but one Scottish one.

The distribution of *Dryas octopetala*, the Mountain Avens, in England and Wales is an equally strange one. In Lakeland it is only on Helvellyn; in Teesdale, on a few square inches of Cronkley Fell; in the Pennines, in one or two places near Arncliffe; in Wales, only on a single spur of one of the Snowdon group; and, most astonishing, it has one station in Staffordshire! The writer has recently examined the Welsh station. On one small rib of calcareous rock, standing but a few feet out of the turf, at the end of a mountain ridge, are six small plants—the only plants known in the Principality. They grow within a few inches of one another, clinging to a weathered rock-face. It is hard to convince one's self that these are the last of a vanished race. They seem much more likely to have only just arrived and to be slowly multiplying.

On a small patch of wet, peaty gravel on the upper slopes of Widdy Bank Fell in Teesdale a few plants of *Arenaria uliginosa*, the Bog Sandwort, are to be found. Nowhere else in the British Isles does this plant grow—its nearest home is Scandinavia. One is asked to believe that this tiny plant was a native in Glacial times and has since been exterminated on every patch of peaty gravel except these few square inches in Teesdale. On examining the patch one sees nothing in the least unique or peculiar about it to stamp it as the only possible place whereon such a plant could survive during all these post-glacial centuries. It seems much more likely that the plant is a comparatively recently established "alien" which has reached this isolated spot "by accident."

On a few patches of bare rocky ground around the base of the Ingleborough massif a few plants of *Arenaria gothica* grow. This is the sole station for the species throughout the length and breadth of the British Isles. So far as the nature of the soil and under-lying rock is concerned there seems no reason why this plant should not grow on many another similar plateau of limestone on or about the Pennines or even further afield. In the unique isolation of its station it is comparable with its relative *Arenaria uliginosa*; but the theorists do not claim that this species of the genus is a "glacial survival;" they suggest that "it may have been recently introduced." It is not an Arctic-alpine, and therefore it is necessary that some different explanation be found to account for its presence. No one has yet suggested a theory which would equally well explain the arrival of both. The first theory with regard to *Arenaria gothica* was propounded when the plant was first noticed in 1889 on a bare patch of ground near the Ribblehead viaduct on the railway just north of Ingleborough. Its seeds, it was said, must have been conveyed there on railway-sleepers imported from Norway for the construction of the permanent way! If the plant was a native of Norway, if it inhabited timber-forests, and if the trees had been imported direct as they were felled, then the theory might have been tenable. But, unfortunately for the theory, the plant does not grow in Norway; nor is it a forest-plant; nor are imported trees cut into sleepers along our railway banks, but shaped and creosoted in intermediate timber-yards. Therefore we must look for some other method by which its seeds can have been carried from Sweden, Gothland or the Jura, where it grows, and deposited on the slopes of Ingleborough and nowhere else in the British Isles.

Have our botanists thoroughly explored the possibility of all these plants being recent arrivals, which, as we have seen, they certainly resemble, rather than "glacial relicts" of long standing? Have all the known agencies for plant dispersal been considered and dismissed as impossible? The writer would draw attention to one agency in particular which, to him, seems able to account for all these and many more "freakish" distributions. This is the agency of birds. Twice every year our Islands are traversed by countless millions of birds. In the autumn the hosts of Arctic-breeding birds pass over on their way to their winter quarters; in the spring an only slightly smaller host repasses going north. Under normal conditions almost nothing of this movement is seen; but it is well known to occur. It is only recently as the result of scientific observation, that the colossal scale of that movement has been fully appreciated. Over the British Isles in autumn the movement is probably more concentrated than over any other tract of land surface; for birds from Northern Europe fly westwards to our shores before turning south along the milder Atlantic sea-board. The autumn migration takes place at the time of the ripening of seed; it would be strange if there were not many viable seeds borne on the limbs, on the plumage, in the crops and alimentary canals of so vast a host. It is not necessary for the birds to alight to deposit their involuntary cargoes. A speck of mud, a portion of a feather, a morsel of excrement, flicked from a passing bird, must fall to earth somewhere and sometimes it will carry a seed. When a seed falls on suitable ground—that of an alpine plant on a mountain, a marsh-plant in a swamp, a water-plant in a pond or river—and the climatic and other conditions being favourable, the seed will germinate and the species may establish itself. In the course of ages this must occur frequently and thus there will be a tendency for northern plants to spread southwards to the extreme limit at which they can maintain themselves and for alpine plants to become scattered upon mountain tops that are far distant from their normal stations. It is these outlying colonies that have puzzled the botanist and encouraged him to propound theories to account for their appearance.

It has already been proved that water-fowl convey plants from pool to pool. Cases have been recorded where newly-made and isolated ponds have been rapidly stocked with water-plants which could only have come from neighbouring ponds by this agency. This is easily understandable. Where water birds are frequently moving short distances from pool to pool they will carry seeds or actual portions of living plants on their feet or adhering to their plumage. A longer carriage has to be envisaged to account for such a case as the recent appearance of *Isoetes echinospora* in Little Sea near Swanage or of *Hydrilla verticillata* in Esthwaite Water. The transference of seeds across Europe by the same agency is quite a reasonable proposition. If water-birds can convey the seeds of water-plants, there seems no reason why land-birds should not convey the seeds of land plants; though owing to the different habits of the species it may not occur so frequently.

It is not easy to obtain direct evidence in proof of this theory; but a more detailed study of the seeds of some of the plants concerned, together with an examination of the bodies of migrating birds, might throw some light on the problem. Here the botanist and the ornithologist might profitably collaborate.

[This article by one of our members appeared in the *Vasculum* for August 1933 and so closely agrees with my own views that I am greatly obliged to Mr Temperley for permission to reproduce it. We welcome not only the collaboration of the ornithologist but also of the entomologist and meteorologist in our enquiry as to the causes of the appearance or disappearance of rare plants. Some of these are in danger of early extinction through the unexplained decrease in the numbers of the particular insects mainly instrumental in their fertilisation, and the influence of favourable winds on bird migration or seed dispersal is also a subject needing further investigation.—Ed.]

NOTES FROM THE WELSH NATIONAL HERBARIUM.

A. E. WADE, F.L.S.

The following notes refer to specimens in the Welsh National Herbarium, National Museum of Wales, Cardiff. New county records are starred. Where these have been published in the List of Welsh Flowering Plants we have added the letters (W.F.P.). We do not publish N.C.Rs. for aliens or species not given in the *Comital Flora*.

Thanks are due to Lt.-Colonel A. H. Wolley-Dod and Mr E. B. Bishop for naming the roses and to Mr W. P. Philipson who has recently revised the naming of the specimens of *Agrostis* in the Herbarium.

1/1b. CLEMATIS VITALBA L., var. INTEGRATA DC. Royden, W. Norfolk, v.-c. 28, A. R. Horwood, 1916. Painswick, E. Glos., v.-c. 33, A. McKenzie, 1924. Clifton Downs, W. Glos., v.-c. 34, A. E. Wade, 1924, and Oneon, S. G. Charles, 1934. Mon., v.-c. 35. Tenby, Pemb., v.-c. 45, H. A. Hyde, 1925. *Near Great Ormes Head, Caernarvon, v.-c. 49, J. D. Massey, 1929. Leigh Woods, N. Somerset, v.-c. 6, J. W. White, 1917. [The Caernarvonshire record is N.C.R. for v.-c. 49, which is bracketed in *T.B.*, ed. ii, and not given in *C.F.* (W.F.P.).]

1/1e. ✠C. VITALBA L. Llanrumney, Mon., v.-c. 35, A. E. Wade. This is a variety or form with leaflets deeply toothed and lobed and appears to come under var. *taurica* Bess., described in Rouy & Foucaud *Flore de France*, i, p. 5, as having " folioles propendément dentées ou incisées-lobées."

†4/2. ADONIS AESTIVALIS L. Waste ground, Splott, Cardiff, Glamorgan, v.-c. 41, R. L. Smith.

†13/7. DELPHINIUM PUBESCENS DC. Allotments, Splott, Cardiff, Glamorgan, v.-c. 41, A. E. Wade, 1926. Grain alien.

35/4c. NASTURTIUM ISLANDICUM (Oeder) Dr., var. MICROCARPUM (Beck.). Splott, Cardiff, Glamorgan, v.-c. 41, A. E. Wade, 1925. ? Adventive.

35/4d. ✠N. ISLANDICUM (Oeder) Dr., var. HISPIDUM (A. Gray). Splott, Cardiff, Glamorgan, v.-c. 41, A. E. Wade, 1929. ? Adventive.

54/15. BRASSICA ALBA (L.) Boiss. Chippenham and Rockfield Road, Mon., v.-c. 35, S. G. Charles.

*88/23. VIOLA SEGETALIS Jord. Near Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

†164/1. ROBINIA PSEUDO-ACACIA L. Two trees in a field near an old mill race, Michaelston le Pit. Glamorgan, v.-c. 41. One seedling was seen.

178/25b. LATHYRUS MONTANUS Bernh., var. TENUIFOLIUS (Roth) Garcke. Trefloyne, Pemb., v.-c. 45, W. F. Grimes.

178/25b. L. MONTANUS Bernh., var. TENUIFOLIUS (Martr.-Don.) Garcke, sub-var. ANGUSTISSIMUS (Rouy) = L. MACRORHIZUS Race ROTHII.

var. ANGUSTISSIMUS Rouy Flore de France, v, 271. This represents the extreme form of the narrow-leaved plant, with the leaflets almost subulate. Penhallo, W. Cornwall, v.-c. 1, F. Rilstone, 1915. Near Bronllys, Breconshire, v.-c. 42, A. E. Wade, 1925. Knighton, Radnor, v.-c. 43, A. McKenzie, 1924. Bach Howey, Radnor, v.-c. 43, A. E. Wade, 1929.

178/25d. L. MONTANUS Bernh., var. OBTUSIFOLIUS (Martr.-Don.) = OROBUS TUBEROSUS, var. OBTUSIFOLIUS Martr.-Don. Florule du Tarn, 186, 1864. "Folioles largement ovales obtuses." The following specimens have obtuse leaflets measuring 3.5-4 cm. × 2-2.2 cm. Near Southam, Warwick, v.-c. 38, G. C. Druce, 1920. Saundersfoot, Pemb., v.-c. 45, P. H. Holland, 1920. High Tor, Matlock, Derby, v.-c. 57, T. H. Corry, 1883.

*190/8. ALCHEMILLA ALPESTRIS Schmidt. Limestone Crags, The Leete, Flint, v.-c. 51, J. D. Massey.

194/6r. ROSA CANINA L., var. RAMOSISSIMA (Rau). Marshfield, Mon., v.-c. 35, A. E. Wade, det. E. B. Bishop. South-east of Pensylvania, near Bassaleg, Mon., v.-c. 35. "Not clearly one of the Transitoriae but perhaps best there under var *ramosissima*," A. H. Wolley-Dod.

*194/10b. R. DUMETORUM Thuill., var. URBICA Léman. North-west of St Mellons, south-east of Pensylvania, near Bassaleg and Marshfield, v.-c. 35, A. E. Wade, det. A. H. Wolley-Dod.

194/10g. R. DUMETORUM Thuill., var. CALOPHYLLA (Rouy & Camus). North-west of St Mellons, Mon., v.-c. 35, A. E. Wade, det. A. H. Wolley-Dod. Between Castleton and Marshfield, Mon., v.-c. 35, A. E. Wade, det. E. B. Bishop.

194/10h. R. DUMETORUM Thuill., var. PLATYPHYLLA (Rau) W.-Dod. Between Castleton and Marshfield, and Marshfield, Mon., v.-c. 35, A. E. Wade. "I prefer to put this under var. *platyphylla* (Rau) W.-Dod, rather than under var. *sphaerocarpa*, but somewhat intermediate," E. B. Bishop.

*194/12e(2). R. GLAUCA Vill., var. SUBCRISTATA Baker (=R. AFZELIANA Fr., var. GLAUCOPHYLLA (Winch) W.-Dod). Marshfield, Mon., v.-c. 35, A. E. Wade, det. E. B. Bishop.

196/1c. CRATAEGUS MONOGYNA Jacq., var. FISSA (Poiret). Near St Mellons, Mon., v.-c. 35, A. E. Wade, 1934.

196/1k. C. MONOGYNA Jacq., var. SPLENDENS Dr. Near Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

196/1p. C. MONOGYNA Jacq., var. SUBCRISTATA Dr. Llanedyrne Road, near Cardiff, Glam., v.-c. 41, A. E. Wade. The fruits are rather more globose than stated in the description in *Rep. B.E.C.*, 1915, being 8-9 × 7 mm.

†279/1. CORIANDRUM SATIVUM L. N.C.R. Waste ground, Mon., v.-c. 35, S. G. Charles, 1934.

284/1c. HEDERA HELIX L., var. SARNIENSIS Dr. Near Lake Vyrnwy, Mont., v.-c. 47, H. A. Hyde, 1934.

†330/1. HELICHRYSUM STOECHAS L. Waste ground, Barry Docks, Glam., v.-c. 41, R. L. Smith, 1923.

427/2f. ✠Sonchus arvensis L., var. riparius Magn. A plant some 6 ft. high, growing in a ditch at Hensol, Glam., v.-c. 41, and collected by Professor R. C. McLean, appears to come under this variety, which is described in Rouy, *Flore de France*, ix, p. 205, as follows:—"Plante très robuste, à port de *S. palustris*; feuilles caulinaires longues (25-35 cent. de long), profondément roncinées, à lobes fortement ciliés-spinuleux et à oreillettes moins arrondies, subaigués; calathides grandes, nombreuses; pédoncules ± allongés."

427/4e. S. oleraceus L., var. runcinatus Coss. & Germ. Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

467/2c. Anagallis arvensis L., var. verticillata Diard. Cultivated field S.W. of Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

517/1c. Solanum Dulcamara L., var. villosissimum Desv. Wyke Regis, Dorset, v.-c. 9, R. L. Smith. Meon, S. Hants, v.-c. 11, R. J. Dix.

517/1d. S. Dulcamara L., var. ovatum Dunal. Sully Island, Glam., v.-c. 41, A. E. Wade. Stanner, Rads., v.-c. 43, H. A. Hyde. Tenby, Pemb., v.-c. 45, J. Grimes. Near Ro Wen, Caern., v.-c. 49, A. Wilson. Near Bringhurst, Leicester, v.-c. 55, A. E. Wade.

517/1e. ✠S. Dulcamara L., var. laciniatum Dunal. Near Bringhurst, Leicester, v.-c. 55, A. E. Wade.

517/2d. S. nigrum L., var. atriplicifolium Dunal. Chepstow, Mon., v.-c. 35, W. A. Shoolbred, 1905. Chippenham, Mon. v.-c. 35, S. G. Charles.

†520/2. Lycium halimifolium Mill. Wonastow Road, Mon., v.-c. 35, S. G. Charles, 1934.

578/2c. Galeopsis Tetrahit L., var. nigricans Bréb. Near Penylan, S.W. of Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

615/5. Polygonum amphibium L. The peduncle is occasionally glandular; the following specimens in the Welsh National Herbarium have this characteristic. Under var. *natans* Moench. Groby Pool, Leicester, v.-c. 55a, A. Baines, 1871. Under var. *terrestre* Lees. Wakerley, Northants, v.-c. 32, A. E. Wade. Skipwith Pool, v.-c. 61, W. Ingham.

615/5c. P. amphibium L., var. glandulosum Schönh. Rowsley, Derby, v.-c. 57, 1898. Ex. herb. Leppington. R. Wiske at its junction with the Ryeback, Northallerton, N.E. Yorks, v.-c. 62, J. A. Wheldon, 1883.

615/7c. P. Persicaria L., var. ruderale Meisn. Bassaleg, Mon., v.-c. 35, A. E. Wade.

615/7e. P. Persicaria L., var. agreste Meisn. Bassaleg, Mon., v.-c. 35, A. E. Wade, 1934.

633/3. ×Ulmus hollandica Mill. Field border, Michaelston le Pit, Glam., v.-c. 41, A. E. Wade, 1934.

637/2c. Urtica urens L., var. iners Wedd. Allotment, Splott, Cardiff, Glam., v.-c. 41, R. L. Smith and A. E. Wade, 1928.

642/2b. Betula pubescens Ehrh., var. glabrata Wahl. Llanmelin Camp, Mon., v.-c. 35, H. A. Hyde. Vyrnwy, Mont., v.-c. 47, H. A. Hyde. [Add v.-c. 47 to *C.F.* Not N.C.R., see *T.B. Suppl.*, i, (W.F.P.).]

†651/6. POPULUS TACAMAHACCA Mill. Copse, near Michaelston le Pit, Glam., v.-c. 41, A. E. Wade, 1934.

780/2f. AGROSTIS ALBA L., var. STOLONIFERA (L.). Near Abergwessin, Breconshire, v.-c. 42, A. E. Wade, det. W. R. Philipson.

780/2f. A. STOLONIFERA L., var. COMPACTA Hart. National Museum of Wales building site, Cardiff, Glam., v.-c. 41, A. E. WADE, 1922, det. W. R. Philipson.

780/3f. A. NIGRA With. *Ham, Surrey, v.-c. 17, C. E. Britton, 30th July 1916. (*B.E.C.*, 1916, as *A. tenuis*, var. *aristata* Druce). *Fairwater, Glam., v.-c. 41 (W.F.P.), A. E. Wade. On the canal wharf, Cromford, Derby, v.-c. 57, C. Bailey, 1884. Near Abbeystead, W. Lancs, v.-c. 60, J. A. Wheldon, 1911. Railway embankment, near Corroun Station, W. Inverness, v.-c. 97, W. A. Shoolbred, 1896, det. W. R. Philipson. [Add v.-cs. 57 and 97 to *C.F.*, but these are not N.C.Rs., see *T.B. Suppl.*, i.]

780/6k. ✠A. CANINA L., var. FASCICULARIS Sinclair. Richmond, Surrey, v.-c. 17, J. Divers, 1912, det. W. R. Philipson.

†808/3. CYNOSURUS ELEGANS Desf. Grain alien, Splott, Cardiff, Glam., v.-c. 41, R. L. Smith, 1927.

A KEY TO THE SPECIES OF RUBI OF THE *LONDON CATALOGUE.*

F. RILSTONE.

The list of fruticose Rubi given in the *London Catalogue* numbers about two hundred species and varieties. Most of these are plants which have been known and studied for many years. In the following pages an attempt is made to provide the student with a simple key by which he may be guided to the identification of these recognised types. Some of them are widespread; others are restricted to comparatively small areas. Any bramble-producing district will provide a proportion of them as well, no doubt, as of other forms—local varieties or hybrids, or, maybe, unnamed or unrecognised species to which the names in the Key are not fully applicable. Figuratively speaking, the Key seeks to provide a map of the main roads, leaving byroads and lanes for tho students' own exploration.

A bramble bush has growth of two kinds:—

1. New stems of the current season's growth bearing leaves but no flowers. These are the "stems" or "barren stems" and their leaves are the "stem-leaves" of the following Key.
2. Flowering shoots or "panicles" which are borne as side branches from the previous year's stems. The panicle leaves are often different from the stem leaves.

The stem is usually five-angled, the angles either sharp or blunt, but it may be more or less deeply furrowed and in some species is quite round. The shape of the stem and the nature of its clothing of hair and prickles call for close attention in bramble study (see Armature). Study of the flowering shoot or panicle is directed mainly to the shape (see Pyramidal, Cylindrical), the mode of branching, the clothing of the rachis and panicle branches, the form and direction of the sepals, and the varying characters of the other floral organs.

TERMS EMPLOYED IN THE KEY.

Armature—The prickly and glandular equipment of stem and panicle. The stalked glands look under the lens like tiny pins stuck in a pin-cushion; the prickles vary from strong hooks to microscopic tubercles and bristles (acicles). Simple armature is that of plants with few or no stalked glands and with stem prickles generally even in size and situated on the angles. Where stalked glands are plentiful on stem or panicle or both the armature is said to be mixed. In plants of mixed armature the stem prickles are usually uneven in size, sometimes extremely so, and scattered, i.e., appearing on the faces as well as on the angles. In *R. radula* and its close allies, however, the prickles are fairly even and not scattered over the faces of the stem, though stalked glands are very plentiful. Caesian plants with prickles scattered over a rounded stem are also included in the mixed armature sections even when devoid of stalked glands.

Acicles—Needle-like bristles found mixed with prickles and stalked glands.

Acuminate—Said of the leaf-point when it is hollowed slightly on both sides like a triangle with sides curved inwardly or the section of a hollow-ground razor. Leaves of cherry and lime are generally acuminate.

Bellardian—Having armature like that of *R. Bellardii.* Armature is said to be Bellardian when the rounded stem is densely clothed with a regularly graded series of prickles, acicles, and stalked glands, ranging from very long to very short, but even the longest prickles are slender and often needle-like. The panicle shows similar extreme variation of armature, and many of the stalked glands on the pedicels are extremely long, quite double the pedicel diameter.

Caesian—Belonging to the group of *R. caesius* (the dewberry). In most Caesian plants the relationship to *R. caesius* is plainly shown by the broad coarsely toothed overlapping leaflets, the lowest almost without stalks, the large showy flowers with rounded petals and the fewer larger drupelets sometimes with a plum-like bloom.

Cordate—Said of the base of a leaflet when it is deeply heart-shaped where the stalk joins it (i.e., like a lime leaf).

Coriaceous—Of a leathery texture.

Cuneate or wedge-shaped—Describes a leaflet which narrows to the base in more or less straight lines. In extreme cases the base is quite triangular, narrowing to a point at the junction with the leaf-stalk.

Cuspidate—Abruptly pointed.

Cylindrical—Describes a panicle which is about as wide above as below.

Digitate—Describes a 5-nate leaf in which all five leaflet-stalks (petiolules) grow from the same point at the top of the petiole.

Drupelets—The individual fruits which in the aggregate make up the blackberry.

Emarginate—Said of a leaflet when the base is slightly hollowed where the stalk joins it.

Entire-based—Said of a leaflet which is not at all hollowed where the stalk joins it.

Falcate—Curved or hook-like.

Felt, on leaf or stem, is seen under the lens to be due to the matting of closely-pressed stellate (i.e., branched or star-like) hairs. When white its presence is obvious but dark felt may easily be overlooked unless a lens is used.

Glabrous—Without hair.

Koehlerian—A word used to describe brambles allied to *R. Koehleri.* These have very varied armature, the glands on the panicle are very uneven in length as in Bellardian plants, but, unlike the Bellardians, the plants have stout and strong though very varied and scattered prickles on the stem. Glandular, i.e., mixed armature, brambles may be graphically represented by the letter " Y "; the lower portion represents the Radulan series, while the two divergent arms represent two divergent series of plants, the one—with stout strong prickles and usually more robust habit—ranging through such forms as *Griffithianus* and *Moylei* to its extreme limit of armature variation in the Koehlerians, the other—of weaker growth and with more slender prickles—ranging through *fuscus, pallidus, scaber, longithyrsiger, tereticaulis,* and similar forms to its extremes in *Bellardii, serpens, viridis, hirtus,* etc.

Lax—Said of a panicle when the branches are comparatively few and well-spaced; quite the opposite of " crowded " or " dense."

Obovate—Broadest above the middle like an egg with the larger end uppermost.

Ovate—Broadest below the middle like an egg with the smaller end uppermost.

Oval—Broadest in the middle like an egg with both ends alike.

Patent—Spreading horizontally or at right angles.

Pedate—Said of a 5-nate leaf when the stalks of the lowest leaflets spring, not from the petiole but from the stalks (petiolules) of the intermediate leaflets. The Christmas rose has pedate leaves.

Pedicel—The stalk of a single flower.

Petiole—The main leaf-stalk.

Petiolule—The stalk of a leaflet.

Plicate—Pleated or corrugated. Sometimes, as in *R. criniger*, the corrugations are confined to the outer margins of the leaflets, which are then described as " wavy-edged." Leaves of the sweet bay (*Laurus nobilis*) are wavy-edged.

Pyramidal—Said of a panicle which is triangular in outline, narrowing to the top.

Quinate (5-nate)—Composed of five leaflets.

Racemose—Describes a panicle with one-flowered branches growing singly from the main axis much as in the flowering raceme of the black currant.

Rhombic or Diamond-shaped—Terms used to describe a leaflet when the usual fully curved outline tends to become straight-lined and the outline of the leaf approximates to that of a diamond-shaped pane in a church window, or two fairly equal triangles placed base to base. Sometimes the upper triangle is conspicuously shorter than the lower, giving the leaflet an outline much like that of a child's kite (" kite-shaped " of this Key).

Rachis—The main axis of the panicle.

Radulan—Armature resembling that of *R. radula*, i.e., main stem prickles fairly even in size and situated on the angles as in the simple armature groups, while the whole plant is abundantly glandular, the stalked glands being fairly even in size.

Suberect—A name applied to a group of plants, perhaps nearer the raspberry than most of our brambles, the main stems of which do not usually arch over and root at the tips as is usual with most forms. The stems are glabrous.

Terminal leaflet (abbreviated to "t. lt.")—The central or endmost leaflet of a 3-nate or 5-nate leaf.

Ternate (3-nate)—Composed of three leaflets.

Truncate—Describes a leaflet which looks as if cut straight across at the top. From this straight-cut top a short point rises abruptly, making the leaf truncate-cuspidate.

Tubercles—Minute prickles reduced to mere limpet-shell like bases (i.e., lacking the usual needle-like point).

Wedge-shaped—See Cuneate.

COLLECTION OF RUBI FOR THE HERBARIUM.

For purposes of study the student should take at least two good panicles and three or four stem pieces, each with a good leaf. The stem characters are best displayed in the middle portion—the growing point and base of the stem are not fully characteristic. In addition, notes should be made in the field of such characters as may become obscure when the plant is dried. Such are the shape, size, and colour of the petals, direction of the sepals, colour and relative lengths of stamens and styles and the general habit of the bush (e.g., stem high or low arching) and the colour of the stem and leaf (the latter may be light or dark green, greyish or yellowish green, and with dull or shining surface). Great care must be taken to ensure that the stem and panicle are really from the same plant. Mixed gatherings cause endless trouble.

Some care, too, is needed at the outset to avoid gathering ill-developed and uncharacteristic growth; such, for example, as shade-grown plants of species which are at their best in open situations. *R. dasyphyllus*, which is abundant over a great part of Wales and Central and Northern England, is when well grown quite Koehlerian in stem, but shade plants may have weak stem-armature which looks anything but Koehlerian. When the student becomes familiar with the species these forms are recognised at sight—the peculiar erratic leaf-toothing and narrow panicle are pretty constant—but the beginner may find them confusing. *R. Moylei*, too, with densely felted leaves in full sun, may lose the felt entirely in shade. The Key, it must be remembered, is an attempt to indicate the typical plants.

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NOTE.—The "mature leaves" referred to in the index and section headings are invariably stem leaves, never panicle leaves.

SECTION A.

Fruiting sepals reflexed, armature simple, mature leaves felted beneath.

1. Stem with stellate down but with little or no long hair (except occasionally in *subinermis*) 2
   Stem glabrous or thinly hairy 3
   Stem usually with a good deal of hair 20
2. Leaves small, usually convex, white-felted beneath, terminal leaflet usually obovate cuspidate, petals pink, crumpled: a common, very late-flowering plant .... *rusticanus*
   Leaves larger with grey or greenish-white felt, t. lt. oval: a rare plant .... *pubescens*
   Leaves frequently very large, t. lt. obovate or oblong-obovate, panicle almost unarmed .... *pubescens*, var. *subinermis*
3. Leaves all, or nearly all, 3-nate, t. lt. obovate or oval, stem with little or much hair, panicle long, variously branched with rachis and branches hairy and grey-felted and with few declining prickles (Devon and Cornwall) ... *egregius*, var. *plymensis*
   Leaves usually 3-nate, t. lt. with rather short point, obovate-cuspidate, panicle long and lax .... *egregius*
   Leaves mostly 5-nate 4
4. Terminal leaflet somewhat diamond shaped or rhombic, floral organs typically all red, panicle with strong hooked often bright red prickles, upper part of panicle rather narrow but with long strongly ascending lower branches .... *rhombifolius*
   T. lt. oval or oval-oblong 5
   T. lt. ovate 8
   T. lt. obovate 12
5. Leaves rather small, often somewhat parallel-sided, stem somewhat furrowed, stouter panicles often crowded above with long prickles, lighter panicles with longer branches and fewer prickles, often one branch long and patent, flowers pink and very showy (S.W. England and S. Wales) .... *thyrsoideus*, var. *viridescens*
   Leaves larger 6

6. Stem glabrous, very dark red or purple, with very large leaves and with white flowers rather crowded at top of panicle. Felt under leaves of a dark ashy colour ...... *altiarcuatus* (=*cariensis* Genev. of *London Catalogue*)
   Stem thinly hairy (with long silky white hairs), stem prickles strong, straight, panicle with strong declining prickles and shaggy rachis ...... *villicaulis*
   Plant not as described above 7

7. Leaves tough and leathery, shining above, leaflets generally convex, t. lt. on long stalk, panicle loose and straggling with few unequal prickles and felted branches (Cornwall and Devon) ...... *ramosus*
   Leaves not leathery nor shining, concave rather than convex, panicle compact with a good many prickles ...... *Brittoni* (Surrey; under *R. ramosus* in *Lond. Cat.*)

8. T. lt. rather finely toothed with stalk about half its own length 9
   T. lt. with shorter stalk 10

9. Leaves quite small, panicle much branched, stem with many mostly falcate prickles ...... *Bakeri*
   Leaves larger, flowers usually white with rounded petals ...... *rhamnifolius*

10. Leaflets thick with thick velvety grey felt beneath, t. lt. often distinctly shouldered at the widest part as if incipiently 3-lobed, sometimes rather like level ledges below a stumpy church spire, panicle narrow, leafy in lower half ...... *incurvatus*
   Leaflets thick with closer but still velvety felt beneath, panicle broader with leaves nearly to the top ...... *subcarpinifolius*
   Plant not as described above 11

11. Stem suberect with crowded prickles, t. lt. with long tapering point (rather like a nettle leaf), leaves often 6 to 7-nate through the t. lt. becoming 2 or 3-lobed ...... *Rogersii*
   Stem generally strong, glabrous or nearly so, deeply furrowed, with fewer prickles, leaves white-felted, not 6 or 7-nate ...... *thyrsoideus*
   Stem bluntly angled, t. lt. narrowly ovate (a Caesian plant from the Cotswolds with stem prickles mostly on angles; an unusual feature for a Caesian) ...... *corylifolius*, var. *calcareus*

12. Leaves very small with fine toothing and rather thin felt, t. lt. with stalk half its own length and with long narrow point, stem prickles mostly falcate, panicle prickles often falcate *Bakeri*
   Leaves quite small and finely toothed but thickly felted beneath, t. lt. long stalked but rather short pointed, panicle prickles slender, straight, declining (a rare plant) *Godroni*, var. *foliolatus*
   Leaves larger 13

13. Prickles very few on stem and panicles, leaves convex shining, stem glabrous, panicle loose and straggling with felted branches (Cornwall and Devon) ...... *ramosus*
   Prickles more numerous 14

14. Leaves rather loosely strigose above, whitish-felted below, wavy edged, t. lt. short pointed, roundish obovate, panicle with crowded prickles ...... *Godroni*, var. *clivicola*
   Plant not as described above 15

15. T. lt. broad with very abrupt point, often truncate-cuspidate, leaves often plicate especially on the panicle, stem leaves losing felt (Cornwall) ...... *nemoralis*, var. *cornubiensis*
   T. lt. with more gradual point 16

16. T. lt. rather narrow on long stalk (half its own length), leaf toothing even and nearly simple, sepals grey—a pale grey-looking plant with narrow prickly short-branched panicle (see note at end of section) ...... *Lindebergii*
   T. lt. with shorter stalk or plant not pale and grey 17

17. Flowers large, pure white, stem prickles long, straight and patent, leaves typically dull white-felted with point often somewhat triangular .... *dumnoniensis*

(A Channel Islands plant with deeply cordate t. lt. and cordate leaves on panicle is var. *cordatifolius*).

Plant not as above described 18

18. Stem, petioles, petiolules, and even leaf veins very dark red, sometimes blackish, prickles with yellow points, leaves 5-nate pedate rather tough and leathery, panicle with long lower branches, rachis with strongly declining prickles ... *argenteus*

(A plant found plentifully south of the Thames with bright or dark red stem and yellow prickles, variable though oftenest obovate t. lt., leaves felted or losing felt, and panicle somewhat glandular, formerly put under this as forma *glandulosa*, is *R. cissburiensis*).

Plant not as described above 19

19. T. lt. acuminate, leaves of thick leathery texture, with thick velvety felt, panicle narrow (see A 10) .... *incurvatus*

T. lt. acuminate, leaves thick and leathery, with thinner but still velvety felt, panicle broader .... *subcarpinifolius*

T. lt. broad, acuminate, with cordate base, panicle broad, lax, often with nearly patent branches and many frequently hooked prickles (Surrey. See A 4) .... *rhombifolius*, var. *megastachys*

T. lt. rather abruptly pointed, felt of a greenish or ashy hue, whole plant rather dull in colour, upper part of panicle narrow, sometimes very narrow, leaves sometimes 6-7 nate (widely distributed and often plentiful) .... *polyanthemus*

20. Leaves very small and finely toothed, t. lt. with stalk half as long as itself, panicle much branched with many flowers *Bakeri*

T. lt. with shorter stalk 21

21. T. lt. rather small and narrow with sides nearly parallel, flowers bright red when first opened, stem densely hairy, sepals long pointed (a south-western plant) .... *iricus*, var. *minor*

T. lt. not parallel-sided 22

22. T. lt. obovate, panicle broad and rather stout with wide-spreading branches, the whole often held stiffly erect like flowering spikes of Horse Chestnut, flowers white with crumpled petals, whole plant decidedly grey in hue (*adscitus* of *Lond. Cat.*) .... *griseoviridis*

T. lt. roundish, ovate, or oval 23

23. Leaves thick, with dull upper surface and with velvety greenish felt beneath, t. lt. oval or roundish, panicle long pyramidal with upper branches patent and rather close together, 1 to 3-flowered. Stem with loose hair, becoming thinner later, stem prickles moderately long, patent or declining *pyramidalis*

Plant not as above described 24

24. Stem densely felted and hairy 25

Stem not heavily felted, except sometimes in *R. Godroni* 26

25. T. lt. roundish with short point, panicle cylindrical, usually dense in upper part, petal roundish, red or white, stem prickles long and straight .... *leucostachys*

T. lt. oval, panicle broader, long and rather lax, with crowded slender prickles on pedicels, rachis and pedicels often very dark and shaggy (especially plentiful in N. Wales where the large showy pink-flowered panicle is often very conspicuous) *macrothyrsus*

26. Petal obovate, bright pink, panicle short and broad, leaves with much white hair beneath, t. lt. oval or ovate (West of Ireland) .... *iricus*

Petal roundish, generally pale pink or white, t. lt. broadly oval, whitish-felted, stem with some down under the longer hair, panicle prickles strong .... *Godroni*
Petal roundish, t. lt. roundish oval with dark felt beneath, panicle prickles weaker, needle-like .... *hirtifolius*, var. *mollissimus*

NOTE.—A plant from the Lake District associated with *R. Lindebergii* and closely allied to it is *R. lacustris* which differs in its compound leaf toothing, broader panicle, and greener sepals with white margins. (See also B 6).

SECTION B.

Fruiting sepals reflexed, armature simple, mature leaves not felted beneath.

1. Leaves so much divided that the leaflets become more or less pinnate, i.e., cut into pairs of narrow segments on either side of the midrib (an escape from gardens) .... *laciniatus*
Leaflets not so divided 2

2. Leaves green with very little hair on either side, panicle narrow, long and leafy, pedicels white or grey-felted .... *Questierii*
(A plant with similarly contrasted colours, but with broader panicle and fairly many stalked glands is *R. Lettii*).
Plant without above striking and unusual contrast between green undersides of leaves and whitish flower stalks 3

3. T. lt. with a somewhat wedge-shaped base, stem generally green, grey, or dull-coloured 4
T. lt. without wedge-shaped base 6

4. Stem hairy at first, then glabrous and glossy, panicle leaflets with very narrow cuneate base, panicle cylindrical, often nodding at top, white-flowered .... *Lindleianus*
Mature stem rather hairy, t. lt. obovate ....

5. T. lt. with rather short point, panicle with rather weak prickles *Schlechtendalii*
T. lt. with longer point, panicle very prickly .... *amplificatus*

6. T. lt. obovate or oval on a very long stalk (one half its own length), leaf toothing compound, panicle lax with many hooked or declining prickles, sepals olive green, white margined (English Lakes) .... *lacustris*
Leaves usually 3-nate, t. lt. with rather short point, obovate-cuspidate, panicle long and lax .... *egregius*
Plant without above combination of characters 7

7. T. lt. obovate 8
T. lt. ovate 20
T. lt. oval or roundish 27

8. Panicle lax, little more than a raceme, stem suberect, furrowed, with a few straight prickles .... *sulcatus*
Panicle very narrow, petals crumpled, t. lt. usually with stalk half its own length .... *caeresiensis*, var. *integribasis*
Panicle narrow, leaves imbricate with teeth very crowded but deeply cut, t. lt. roundish obovate with stalk about one-third its length, stem prickles short, declining. (The overlapping leaflets with "overcrowded" teeth are very noticeable in the plant from the original locality, the Wye valley below Monmouth) .... *imbricatus*
Panicle broader, more branched 9

9. Leaves very large, leaflets all broad, stem furrowed throughout and almost without hair (Babington's plant from Scotland) *latifolius*
Plant not as above described 10

10. Fully developed panicle abnormally large, long, pyramidal, with its branches strikingly felted .... *egregius*, var. *bracteatus*
(*mercicus*, var. *bracteatus* of *Lond. Cat.*).
Panicle less strikingly developed 11

Leaves all, or nearly all, 3-nate, t. lt. obovate or oval, stem with little or much hair, panicle long, variously branched with rachis and branches hairy and grey-felted and with few declining prickles (Devon and Cornwall) ... *egregius*, var. *plymensis*

11. Stem and often leaf stalks and midribs dark red, stem prickles with yellow points, leaves usually 5-nate pedate. (See A 18; the leaves of this species may retain the felt or lose it when mature) ...... *argenteus*
Plant not as above described 12

12. Stem with a good deal of hair 13
Stem thinly hairy or glabrous (fairly hairy when young in *R. Colemanni*) 14

13. Leaflets long, narrow and coarsely toothed. (See B 33 below) *silvaticus*
Leaflets roundish; a striking feature is the silky sheen of the close white hair on the underside of all leaflets *hirtifolius*, var. *orbifolius*

14. T. lt. shortly and rather abruptly pointed 15
T. lt. more gradually pointed 17

15. Leaves often plicate, especially on panicle, stem leaves white-felted at first, panicle leaves usually white-felted throughout, flowers large, soft pink, panicle rather small and narrow in poor soils, large leafy and well-branched in good soil, rachis stout and felted. Mature leaves often lose the felt (Cornwall, plentiful) ...... *nemoralis*, var. *cornubiensis*
Plant not as described above 16

16. Stem prickles rather short, declining, t. lt. with long stalk ...... *nemoralis*
Stem prickles long and patent, leaflets often overlapping, panicle showy, flowers bright pink (Commons near London) *imbricatus*, var. *londinensis*

17. Panicle long and narrow with flowers on long greyish or whitish felted pedicels, the latter sometimes strongly ascending, i.e., almost erect, sepals long-pointed (not a common plant) ...... *nemoralis*, var. *glabratus*
Panicle not as described above 18

18. Panicle prickles slender and needle-like, leaf toothing finely cut, t. lt. with cordate base (typical yellowish-stemmed plant from neighbourhood of Bangor) ...... *chrysoxylon*
Panicle prickles strong 19

19. Leaves coarsely toothed, stem very prickly, prickles compressed, rachis very prickly and hairy with falcate prickles generally predominating ...... *Colemanni*
Leaves deeply but not very coarsely toothed, panicle with shaggy rachis, prickles on stem and rachis most often long and straight ...... *villicaulis*
T. lt. broad, acuminate, with cordate base, panicle broad, lax, often with nearly patent branches and many frequently hooked prickles (Surrey. See A 4) ...... *rhombifolius*, var. *megastachys*

20. T. lt. large, often triangular ovate, stem furrowed, glabrous or nearly so, panicle leafy ...... *stanneus*
(The Cornish plant recorded as *latifolius*).
T. lt. not triangular ovate 21

21. Floral organs all pure white, panicle irregular, pedicels felted, t. lt. usually long-pointed ...... *leucandrus*
Floral organs not all pure white or panicle regular in shape ... 22

22. Stem distinctly furrowed, glabrous or nearly so 23
Stem not much furrowed 24

23. Panicle elongate, often little more than a raceme, stem suberect ...... *sulcatus*
Panicle normally stout and short, leaflets broad, coarsely toothed, thinly softly hairy below ...... *gratus*

Panicle normally short and small, leaflets broad, coarsely toothed and lobed, densely softly hairy below, perhaps felted when young (Babington's plant from Scotland) .... *latifolius*

24. Stamens short, rarely exceeding styles, stem and panicle prickly with usually curved or hooked prickles, leaves often blotched with red above, t. lt. roundish ovate, stem nearly glabrous .... *Selmeri*

Stamens longer 25

25. T. lt. with cordate base, stem glabrous, or nearly so, prickles on main stem straight and very long .... *affinis*

Stem hairy, t. lt. not usually cordate 26

26. Flowers white, panicle rather long, t. lt. with a remarkably long narrow point (Dorset) .... *purbeckensis*

Flowers pinkish, panicle rather long, t. lt. with point of varying length but not remarkably long and narrow as in above species .... *hirtifolius*

Flowers bright red or bright pink, panicle broad and stout, short (West of Ireland) .... *iricus*

27. Leaves thinly hairy beneath, stem glabrous (or thinly hairy in *R. mercicus*) 28

Leaves with a good deal of soft hair beneath 31

28. Leaves small, t. lt. oval, panicle varying from racemose to remarkably branched and compound .... *affinis*, var. *Briggsianus*

Leaves larger or panicle different 29

Leaves rather small, often somewhat parallel-sided, stem somewhat furrowed, stouter panicles often crowded above with long prickles, lighter panicles with longer branches and fewer prickles, often one branch long and patent, flowers pink and very showy (S.W. England and S. Wales) .... *thyrsoideus*, var. *viridescens*

29. Panicle very narrow and lax, generally little more than a raceme, t. lt. on long stalk (nearly half its own length). petals crumpled, soon falling .... *caeresiensis*, var. *integribasis*

Panicle long and lax, usually a raceme, stem suberect, furrowed, leaves large, t. lt. with long point .... *sulcatus*

Panicle not usually racemose or narrow 30

30. Panicle lax, irregular, pedicels often long and slender with very slender prickles, leaves dark green (a scarce plant of the Midlands) .... *mercicus*

Panicle regular, cylindrical, broad and short, leaves glabrous and wrinkled above, t. lt. typically oval (a local Derbyshire plant) .... *durescens*

Panicle regular, pyramidal, with little or no felt on rachis and pedicels, t. lt. acuminate, roundish or broadly oval, stem glabrous (especially common in Wales) ...... *nemoralis*, var. *Silurum*

31. Leaves coarsely toothed 32

Leaves with finer teeth 34

32. Leaves 3 to 5-nate, t. lt. broadly oval, with long acuminate point, very coarsely toothed, panicle long, pyramidal with very wavy rachis, long pointed sepals and numerous stalked glands. Stem prickles slender rather scattered. (Panicles often very large, sprawling on the foliage or hanging down the sides of the bush—Cornwall and Devon) .... *adscitus*

Leaves usually 5-nate, t. lt. oval-obovate or roundish, leaflets broad and imbricate, panicle long, the upper branches patent with 1 to 4 pure white flowers (Cheshire) .... *castrensis*

Plant not as described above 33

33. Flowers bright red or bright pink, panicle short and broad, leaves large, t. lt. oval (Ireland) .... *iricus*

Flowers paler, usually white, panicle long and leafy, leaflets narrow and long-pointed .... *silvaticus*

Flowers bright red or bright pink, leaves small, t. lt. rather parallel-sided, panicle cylindrical (south-western counties) *iricus*, var. *minor*

34. All leaflets on stem leaves broad, t. lt. rounded cordate acuminate with long petiole nearly half its own length, panicle cylindrical, mature stem glabrous (Armagh and Down) ... *Lindleianus*, var. *latifolius*

Leaves large, generally very large, t. lt. oval-cordate, panicle rather weak and weakly armed, stem hairy .... *macrophyllus*

Leaves very large and densely hairy below, t. lt. oval, panicle very strong with rather crowded prickles (see A 6) .... *altiarcuatus*

Leaves all, or nearly all, 3-nate, t. lt. obovate or oval, stem with little or much hair, panicle long, variously branched with rachis and branches hairy and grey-felted and with few declining prickles (Devon and Cornwall) ... *egregius*, var. *plymensis*

T. lt. roundish oval, panicle cylindrical with weak needle-like prickles, stem usually hairy .... *hirtifolius*, var. *mollissimus*

T. lt. nearly circular with very short point, panicle long with crowded prickles, stem glabrous with stout strong prickles. (On open ground in Scotland the low-domed bushes are as rounded in outline as the terminal leaflets) .... *Scheutzii*

Plant not as described above, t. lt. oval 35

35. Stem prickles long and even in length. (See B 19 above) .... *villicaulis*

Stem prickles short or unequal 36

36. T. lt. rounded below with very long narrow acuminate point, stem prickles unequal, straight, slender, declining, flowers white (Dorset and S. Hants) .... *purbeckensis*

T. lt. with shorter point 37

37. T. lt. rather rounded, stem prickles unequal, rather short, patent, flowers white with white stamens longer than green styles (Surrey, Oxfordshire and W. Sussex) .... *surrejanus*

T. lt. rather rounded, stem prickles more or less declining, stamens hardly longer than styles (W. Sussex) *surrejanus*, var. *wealdensis*

(*R. purbeckensis* and *R. surrejanus* = *R. leucanthemus* of *Lond. Cat.*).

SECTION C.

Fruiting sepals reflexed, armature mixed, leaves felted beneath.

1. Plant almost without stalked glands but with more or less slender prickles scattered over a roundish stem, pedicels white-felted (Caesian) 2

Plant considerably glandular in stem or panicle or both 4

2. Stem hairy, flower white (a plant of the Bristol neighbourhood) *Bucknallii*

Stem glabrous or nearly so (varieties of *R. corylifolius*) 3

3. T. lt. roundish with short point .... var. *conjungens*

T. lt. with longer point often somewhat lobed or divided ...... var. *sublustris*

4. Drupelets rather large and only fairly many, flowers showy with rounded petals, leaves broad, leaflets short-stalked and overlapping, basal almost sessile (Caesian—see note after Section N) .... *dumetorum*

Drupelets usually more or less normal in size and number (i.e., averaging 30 or 40 to the fruit) 5

5. T. lt. widest about the middle and thence narrowed each way (i.e., between diamond-shaped and oval), panicle very wavy (i.e., rachis zigzag) and leafy with short branches and very short glands .... *foliosus*

T. lt. roundish rhombic, stem roundish with some stout prickles, panicle narrow, lax, few-flowered, with dark purple glands in abundance, some very long and a few even on the surface of upper panicle leaves .... *rubiginosus*

T. lt. narrow oval, parallel-sided, stem reddish and glossy almost without hair, felt under the leaves often dark or greenish .... *apiculatus*

Plant not as described above 6

6. Panicle almost without prickles, panicle branches often almost erect, flowers small red, stem with many pricklets .... *Boraeanus*

Panicle peculiar—typically lax and broadly cylindrical with truncate top, branches roughly at right angles to rachis and some even pointing downward, each long with an umbel-like cluster of flowers at the end, the whole thickly clad with felt, hair, and slender prickles; t. lt. oblong-oval or obovate, broad, stem prickles mostly on angles and fairly equal .... *Babingtonii*

Plant not as described above 7

7. Stem densely hairy, leaves remarkable for the patent or recurved state of the larger teeth, panicle long and leafy with the lower branches remote and generally very short (Koehlerian) .... *dasyphyllus*

T. lt. without the ugly, "pointing-any-way" toothing described above 8

8. Leaves usually 3-nate, t. lt. with long point, prickles very slender on stem and panicle (Norfolk) .... *Lintoni*

Leaves usually 3-nate, t. lt. with rather short point, obovate-cuspidate, panicle long and lax .... *egregius*

Leaves usually 5-nate 9

9. T. lt. diamond-shaped (i.e., rhombic), stem with strong bright red prickles .... *setulosus*

T. lt. ovate 10

T. lt. obovate 14

T. lt. oval or roundish 21

T. lt. variable even on same plant (common south of the Thames—see A 18) .... *cissburiensis*

10. Stem considerably hairy 11

Stem with little or no hair 12

Stem somewhat hairy, prickles on the angles few and strong, nearly equal, flat faces of stem rough with a crowded growth of nearly equal stalked glands, acicles and pricklets, t. lt. broad, cordate .... *radula*

11. T. lt. roundish ovate, leaves usually white-felted, stem with strong but unequal red prickles (see C 19) .... *Griffithianus*

T. lt. with long acuminate point and coarse irregular toothing, leaflets rather dark-felted below, edges wavy, stem densely hairy, prickles chiefly on angles, weak, declining *criniger*

T. lt. with sharp deep very compound toothing, leaves greenish felted beneath, stem furrowed with abundant prickles, deep purple or red, panicle cylindrical, narrow and leafy, panicle leaves also with very prominent teeth .... *echinatus*

T. lt. with long acuminate point, leaves shining white-felted beneath, rather finely toothed .... *fuscus*, var. *macrostachys*

12. Stem yellowish-brown with strongly declining prickles, leaf toothing very even, occasionally almost obsolete, panicle pyramidal, rachis with yellowish-brown hair and slender crowded declining prickles .... *Leyanus*

Stem not yellowish-brown 13

13. Flowers greenish-white, leaves very softly felted beneath, wrinkled above, coarsely toothed, t. lt. with very long point, pedicels with little or no hair but with dark stalked glands standing out conspicuously from close white felt (Plym Valley, Devon. *R. mutabilis*, var. *nemorosus* of *Lond. Cat.*) ...... *sagittarius*

Flowers pink, t. lt. broadly ovate, sharply toothed, panicle cylindrical with branches patent or nearly so, stem usually dark purple with abundant unequal prickles ...... *raduloides*

14. T. lt. with base rather wedge-shaped or at least narrowed considerably 15

T. lt. not wedge-shaped nor considerably narrowed 16

15. Stem prickles slender declining, leaflets narrow, those on the panicle often strikingly cuneate, panicle narrow with only fairly many prickles. (*R. ericetorum*, var. *sertiflorus* of *Lond. Cat.*) ...... *raduticaulis*

Stem prickles slender declining, panicle narrow, panicle and leafstalks with abundant slender mostly curved prickles ... *uncinatus*

Stem very prickly with prickles varied, those on angles usually stout and strong, panicle when well developed long and broadly pyramidal, leaflets cuneate or much narrowed at base. (*R. ericetorum* of *Lond. Cat.*) ...... *Moylei*

Shade grown plants of *R. Moylei* may lack felt beneath the stem leaves. The species occurs in Herefordshire and in counties south of the Thames.

16. Leaflets narrow, t. lt. normally on a very long stalk (often half its own length), stem greenish (*R. radula*, var. *anglicanus*) *ericetorum*

Leaflets broader 17

17. Stem glabrous or very thinly hairy 18

Stem considerably hairy 19

18. Armature of stem typically radulan but panicle very prickly. (In well-grown plants the contrast between the moderately armed stem and robust very prickly panicle is sometimes so great that they look as if they belong to different plants) *radula*, var. *echinatoides*

Stem prickles strong, uneven (see C 13) ...... *raduloides*

(N.B.—*R. Newbouldii* occasionally has felted leaflets. See D 31).

19. Typical plant with unequal strong bright red prickles both on panicle and stem and white felt on pedicels and beneath the leaves—an unusual contrast ...... *Griffithianus*

Plant without above contrasts 20

20. T. lt. roundish obovate or narrower, stem dark purple with patent prickles but few acicles or stalked glands, reflexed fruiting sepals white and conspicuous ...... *vestitiformis*

T. lt. roundish obovate, stem with many acicles and stalked glands ...... *cinerosus*

T. lt. not roundish obovate (but obovate, short-pointed with narrowed base), whole plant yellowish and very prickly both on stem and broad panicle, panicle rachis and branches hairy and felted ...... *Borreri*

T. lt. with long acuminate point, leaves shining white-felted beneath, rather finely toothed ...... *fuscus*, var. *macrostachys*

21. T. lt. narrow oval, normally on very long stalk, stem greenish (*R. radula*, var. *anglicanus*) ...... *ericetorum*

R. echinatus may have also an admixture of rather narrow oval t. lts. (See C 11).

T. lt. broader or with shorter stalk 22

22. T. lt. oval, narrowed at both ends, leaflets all long with deeply cut teeth and with greenish-grey felt beneath, stem pale with prickles chiefly on angles (Hants, Sussex and Surrey) =*mutabilis* of *Lond. Cat.* ...... *Wedgwoodiae*

R. Wedgwoodiae, var. *Naldretti*, from the Sussex Downs has the oval or oval-obovate t. lt. with simple shallow nearly regular teeth, stem glandular with crowded tubercle-based prickles and strong uneven acicles, and panicle somewhat pyramidal with truncate top and crowded slender prickles. The var. *Sabrinae*, from W. Gloucester, Glamorgan, and Brecon differs from the type in its pink or lilac (instead of whitish) petals and broader t. lt., less narrowed below.

T. lt. oval long pointed coarsely toothed, panicle long pyramidal with very wavy rachis, long pointed sepals and numerous stalked glands (Devon and Cornwall; see B 32) ... *adscitus*

T. lt. with sharp deep very compound toothing, leaves greenish felted beneath, stem furrowed with abundant prickles, deep purple or red, panicle cylindrical, narrow and leafy, panicle leaves also with very prominent teeth .... *echinatus*

T. lt. broadly oval 23

23. Panicle broad but of light appearance because of the slenderness of the (sometimes interwoven) rachis branches and pedicels, t. lt. with entire base (see D 3) .... *rudis*

Panicle more heavily built, broad and leafy, stem leaves large, t. lt. with cordate base .... *Gelertii*

SECTION D.

Fruiting sepals reflexed, armature mixed, mature leaves not felted beneath.

1. T. lt. broadest about the middle (more diamond shaped than oval), leaves chiefly 3-nate, rachis very wavy, panicle narrow and leafy with very short stalked glands .... *foliosus*

T. lt. much as in *R. foliosus*, but rachis not strikingly zigzag as in that species, stalked glands longer (a small plant from Sprowston Heath, Norfolk) .... *Lintoni*

T. lt. usually narrow, widest as a rule just above the middle and tapering to base and point (in outline often much like a boy's kite), panicle narrow cylindrical usually with many narrow leaves. Flower white or faintly pinkish. Plant early in flower and fruit (Cornwall and Devon: very common in West Cornwall) .... *Rilstonei*

T. lt. broadest above middle and narrowed each way (kite-shaped), leaves very large, panicle an enormous triangle sometimes twenty inches across base, armature Bellardian *Kaltenbachii*

T. lt. almost oblong, i.e., parallel-sided, with uneven toothing, truncate cuspidate, leaves chiefly 3-nate, panicle narrow ... *regillus*

T. lt. usually oblong-obovate, with some teeth recurved, panicle large, lax .... *curvidens*

T. lt. rather roundish rhombic, panicle very glandular with a few stalked glands on surfaces of upper panicle leaves (see C 5) .... *rubiginosus*

T. lt. ovate, obovate, oval, or round 2

2. T. lt. usually oval but may be ovate or obovate, shortish pointed, stem roundish, closely downy, with main prickles short and stout and fairly equal in size, stem rough with abundant tubercles and (or) short rigid bristles .... *scaber*

Panicle peculiar—typically lax and broadly cylindrical with truncate top, branches roughly at right angles to rachis and some even pointing downward, each long with an umbel-like cluster of flowers at the end, the whole thickly clad with felt, hair, and slender prickles; t. lt. oblong-oval or obovate, broad, stem prickles mostly on angles and fairly equal .... *Babingtonii*

T. lt. obovate or oval, plant hairy, panicle leafy with felted pedicels and long slender prickles, stalked glands plentiful on petioles and petiolules (especially of panicle leaves), much fewer elsewhere (Co. Down) .... *Lettii*
Plant not as above described 3

3. T. lt. variable even on the same plant (see A 18) .... *cissburiensis*
T. lt. ovate or oval or even diamond shaped, stalked glands on stem numerous and very short, panicle usually much branched but of light appearance because of the slenderness of the long (often interlacing) branches and pedicels and the smallness of the flower and fruit; t. lt. of panicle leaves with cuneate base .... *rudis*
T. lt. obovate 4
T. lt. ovate 32
T. lt. oval or roundish 42

4. Leaves small, leaflets narrow with long points, sepals strongly reflexed (Epping Forest) .... *Powellii*
Leaves larger or wider 5
5. Stem densely hairy with abundant stalked glands (sunk in the hair) and slender prickles: leaves 3-nate, base of t. lt. somewhat wedge-shaped, panicle few-flowered lax, leafy (Sprowston Heath, Norfolk) .... *tereticaulis*
Plant not as above 6
6. Stem considerably hairy 7
Stem glabrous or thinly hairy 20
7. Panicle long, very narrow, interrupted below with very short lower branches, leaves with main teeth patent or recurved (Koehlerian) .... *dasyphyllus*
Plant not as above described 8
8. Stem leaves 3-nate, stem purple, roundish, with slender varied prickles, panicle broad with many patent branches, stalked glands purple, armature Bellardian .... *divexiramus*
Armature not Bellardian 9
9. Whole plant yellowish, very prickly (see C 20) .... *Borreri*
Plant not noticeably yellowish or not unusually prickly........ 10
10. Plant glandular; pedicels white-felted contrasting with green under surfaces of leaves .... *Lettii*
Plant not so contrasted 11
11. Base of t. lt. narrowed and wedge shaped 12
Base of t. lt. not wedge shaped 15
12. T. lt. shortly and abruptly pointed, stem dark purple with blunt angles, main prickles on angles: fairly even stalked glands numerous on faces .... *cenomanensis*
T. lt. with more gradual point 13
13. Leaves very large, panicle an enormous triangle (see D 1) .... *Kaltenbachii*
Panicle not abnormally large 14
14. Panicle narrow cylindrical with crowded slender curved prickles .... *uncinatus*
Panicle lax, pyramidal .... *Lejeunei*
Panicle a long lax leafy cylinder with 1-2 flowered branches, stem leaves 3-nate with strikingly wedge-shaped base of t. lt. (The panicle is unique: well spaced branches of equal length interspersed with leaves stand at right angles to the rachis each usually carrying two flowers) .... *thyrsiger*
15. T. lt. broad, abruptly cuspidate .... *mucronatus*
T. lt. with more gradual point 16
16. Panicle narrow and leafy with dark red rachis, highly glandular and aciculate, leaves coarsely toothed, stem bluntly angled, stem prickles long and slender, not very unequal, patent or slightly declining (Dorset) .... *praeruptorum*

Plant not as described above 17

17. T. lt. typically narrow and very long pointed, prickles slender declining, not very unequal, pale in colour, panicle lax, stalked glands very dark coloured .... *pallidus*
T. lt. more broadly obovate 18

18. Flowers small, greenish white, stalked glands on stem short and abnormally numerous .... *pallidus*, var. *leptopetalus*
Flowers not greenish white 19

19. Prickles on stem scattered, hooked or strongly declining, panicle peculiar—lax, broad with three or four flowers at end of each long slender branch .... *acutifrons*
Prickles on stem weak, declining or curved, chiefly on angles, panicle shaggy, broad and leafy with slender prickles, point of t. lt. generally curved, toothing often coarse .... *Bloxamii*
Prickles on stem rather short and fairly equal, partly on the angles, panicle cylindrical, stem densely hairy .... *fuscus*

20. Stem and petioles blackish purple (often as if ink-stained), t. lt. shortly and abruptly pointed (obovate-truncate—sometimes rather cuneate), panicle narrow and lax .... *melanodermis*
Stem not blackish purple 21
21. Stem crowded with very unequal scattered prickles, panicle broadly laxly cylindrical with long patent branches, pedicels crowded with long slender prickles .... *Koehleri*
Prickles not so crowded nor unequal 22
22. T. lt. roundish obovate with abrupt point 23
T. lt. with narrower, not roundish, base or without abrupt point 24
23. Leaves 3-nate, stem with crowded short declining prickles, glands and tubercles, panicle long .... *ochrodermis*
Leaves large, 3-5 nate, stem with rather few glands .... *morganwgensis* (=*horridicaulis*)
24. Leaves usually 5-nate, t. lt. with wedge-shaped base and abrupt point .... *cenomanensis*
Leaves 3-nate, t. lt. obovate cuspidate , petals narrow, white ... *longithyrsiger*
Leaves usually 3-nate, t. lt. truncate obovate cuspidate, petals narrow .... *botryeros*
Petals not narrow or leaf different 25
25. T. lt. with somewhat wedge-shaped base 26
T. lt. without wedge-shaped base 28
26. Panicle narrow with crowded slender curved prickles .... *uncinatus*
Panicle not crowded with slender curved prickles 27
27. Leaflets narrow, those on panicle extremely wedge shaped ... *radulicaulis* (=*sertiflorus* of *Lond. Cat.*)
Leaflets fairly broad .... *cenomanensis*
28. T. lt. large, roundish obovate, panicle very prickly, large, lax and spreading .... *festivus*
Plant not as described above 29
29. Leaves mostly 3-nate, t. lt. with rather short point, obovate-cuspidate, panicle long and lax (rare) .... *egregius*
Leaves mostly 5-nate 30
30. Panicle lightly built with slender intertwining branches and pedicels, stalked glands numerous and very short (see D 3) *rudis*
Panicle stouter 31
31. Stem with blunt angles, panicle with wide erratic branching (see H 21) .... *mucronatoides*
Stem sharply angled, panicle more regular .... *Newbouldii*
32. T. lt. gradually narrowed to a very long point (Monmouth and neighbouring counties) .... *cavatifolius*
T. lt. with shorter or more acuminate point 33

33. Stem yellowish brown with declining prickles (see C 12) .... *Leyanus*

Plant much like *R. Leyanus* (C 12) but main prickles patent or nearly so (Co. Down) .... *hibernicus*

(var. *dunensis* has stronger armature).

Plant not as described in C 12 or above 34

34. Stem thickly hairy, leaves small, coarsely toothed, very hairy below, panicle narrow above with distant lower branches either erect or spreading, looking like smaller copies of the upper part, stem prickles mostly patent, very unequal (Koehlerian) .... *Marshalli*

Plant not as described above 35

35. Stem considerably hairy 36

Stem glabrous or thinly hairy 39

36. Leaflets narrowly ovate (see D 17) .... *pallidus*

Leaflets broadly ovate 37

37. Leaves mostly 3-nate, t. lt. roundish ovate, panicle lax, armature Bellardian .... *flaccidifolius*

Leaves mostly 5-nate 38

38. Stem purplish or brownish, t. lt. with very long point, panicle lax, usually drooping with narrow simple leaves .... *nuticeps* (*R. fuscus*, var. *nutans*)

Stem purple or brownish, t. lt. with fairly long point, panicle not drooping .... *fuscus*

Stem reddish or reddish brown (see D 19) .... *acutifrons*

39. Leaves with soft hair beneath, leaves deeply toothed, 5-nate, stems angled (a scarce plant ?) .... *Koehleri*, var. *cognatus*

Leaves only thinly hairy beneath 40

40. T. lt. large roundish-ovate, petioles and panicle densely clothed with long stalked glands, acicles and slender prickles, armature Bellardian (Dorset) .... *Durotrigum*

Armature not Bellardian 41

41. Stalked glands very short, panicle light (see D 3) .... *rudis*

Stalked glands long, leaves rather small, panicle with lower branches as in *R. Marshalli* (see D 34 and H 26) .... *Marshalli*, var. *semiglaber*

42. T. lt. roundish 43

T. lt. oval 44

43. Leaves mostly 3-nate, large, t. lt. with short point, sepals long pointed, stem with little hair, large prickles on angles, fairly equal, tubercles, etc., numerous on faces .... *rosaceus*

Leaves mostly 5-nate, panicle lax, broad and prickly .... *festivus*

Leaves mostly 5-nate, finely toothed, plant rather intermediate between *Borreri* and *infestus* .... *infestus*, var. *virgultorum*

44. Panicle long with very wavy rachis, leaves large, very coarsely toothed (Devon and Cornwall, see B 32) .... *adscitus*

Plant not as above 45

45. Leaves thinly hairy beneath 46

Leaves considerably hairy beneath 47

46. Panicle broad but light (see D 3) .... *rudis*

Panicle narrow, stalked glands on panicle longer than the hair *podophyllus*

47. Stem prickles crowded and very unequal .... *Koehleri*

Stem prickles not very uneven 48

48. Panicle with dense felt. t. lt. broadly oval .... *Gelertii*

Panicle with little felt, t. lt. more narrowly oval, or through the narrowing of the base rather obovate, leaves coarsely and sharply toothed with veins prominent beneath and long acuminate point, sepals long-pointed, usually erect at first (Devon) .... *Borreri*, var. *dentatifolius*

SECTION E.

Fruiting sepals spreading more or less horizontally, armature simple, mature leaves felted beneath.

1. Leaflets long and narrow, parallel-sided, t. lt. on a rather long stalk ...... *lasioclados*, var. *angustifolius*
   Leaflets not as described above 2
2. Leaflets very small and finely toothed, t. lt. on long stalk (see A 12) ...... *Bakeri*
   Leaflets larger 3
3. Stem hairy and felted, panicle very prickly 4
   Stem glabrous or nearly so, t. lt. oval long-pointed, panicle almost without prickles, flowers on long pedicels except terminal flower which has a very short stalk ...... *opacus*
4. Stem prickles falcate or declining, panicle close ...... *lasioclados*
   Stem prickles long and straight, patent or nearly so, panicle lax ...... *lasioclados*, var. *longus*

SECTION F.

Fruiting sepals spreading more or less horizontally, armature simple, mature leaves not felted beneath.

1. Ripe fruit dark red, not black, panicle little more than a raceme, leaves often 6-7 nate, stem suberect 2
   Ripe fruit black 3
2. Leaves thick, plicate, hairy below, prickles numerous, long and slender ...... *fissus*
   Leaves large thin not plicate, almost hairless, prickles few and short ...... *suberectus*
3. Leaves plicate, pale green, 5-nate or occasionally 6-7 nate, t. lt. long and acuminate, oftenest oval but also ovate or obovate, flowers white—a pale and very prickly plant with yellowish prickles especially common south of London ...... *carpinifolius*
   Plant not as described above 4
4. T. lt. ovate 5
   T. lt. obovate 9
   T. lt. oval or roundish 11
5. Mature stem deeply grooved above, with prickles mostly short, leaves very large, flowers rose-coloured large and showy (N. Wales) ...... *monensis*
   (*R. latifolius* of *Lond. Cat.* in part.)
   Mature stem not deeply grooved 6
6. Stem suberect, panicle racemose or nearly so, prickles often hooked 7
   Stem not suberect, prickles declining not hooked, panicle not racemose 8
7. Stamens hardly longer than styles, basal leaflets hardly stalked ...... *plicatus*
   Stamens much longer than styles, basal leaflets distinctly stalked ...... *plicatus*, var. *Bertramii*
8. Panicle broad and short (a local Derbyshire plant) ...... *durescens*
   Panicle long (plant chiefly from Ireland) ...... *hesperius*
9. Panicle very narrow, petals crumpled, t. lt. on stalk half its own length ...... *caeresiensis*, var. *integribasis*
   Panicle long, flowers on long stalks typically red, t. lt. on stalk about one-third of its own length ...... *holerythros*
   Panicle different 10
10. Stem glabrous (see B 34) ...... *Scheutzii*
    Stem considerably hairy ...... *hirtifolius*

11. T. lt. oblong-oval, small, shining green, panicle compound, with many flowers and numerous prickles .... *nitidus*
T. lt. oblong-oval, large, with large compound toothing, teeth somewhat erratic in direction .... *calvatus*
T. lt. not oblong oval 12

12. T. lt. large, broadly oval, with large compound toothing (see F 11 above) .... *calvatus*
T. lt. without large erratic toothing 13

13. T. lt. small oval, short pointed, rachis and pedicels felted *opacus*, var. *minor*
T. lt. larger or with longer point 14

14. T. lt. with cordate or subcordate base 15
T. lt. without cordate base—emarginate or entire 17

15. T. lt. roundish or oval (or oval obovate) leaflets broad and imbricate, panicle long, the upper branches patent with 1 to 4 flowers, the flowers pure white (Cheshire) .... *castrensis*
Plant not as described above 16

16. T. lt. very gradually narrowed to the point, panicle almost without prickles, flowers all long-stalked except the short-stalked terminal flower .... *opacus*
T. lt. with less gradual point (see B 30) .... *durescens*

17. Flowers red, large, showy, on long stalks .... *holerythros*
Flowers rather small, on long stalks, petals pink, usually crumpled .... *Sprengelii*

SECTION G.

Fruiting sepals spreading more or less horizontally, armature mixed leaves felted beneath.

1. Stem considerably hairy 2
Stem with little hair 5

2. Whole plant yellowish and very prickly, panicle broad .... *Borreri*
Plant not noticeably yellowish 3

3. Stem prickles strong unequal, leaves white felted (see C 19) ... *Griffithianus*
Plant not as above described 4

4. Stem very hairy, prickles very unequal, flowers bright red (Koehlerian) .... *fusco-ater*
Stem fairly hairy, flowers pinkish, panicle peculiar (see C 6) ... *Babingtonii*

5. T. lt. cordate ovate acuminate, very soft below (see C 13) .... *sagittarius*
T. lt. broadly ovate, stem and panicle strongly armed with curved prickles .... *infestus*
T. lt. broadly ovate, stem yellowish with declining prickles (see C 12) .... *Leyanus*
T. lt. ovate or oval or even diamond shaped, stalked glands on stem numerous and very short, panicle usually much branched but of light appearance because of the slenderness of the long (often interlacing) branches and pedicels and the smallness of the flower and fruit: t. lt. of panicle leaves with cuneate base .... *rudis*
T. lt. not ovate 6

6. Stem and panicle blackish-hued, leaflets with fine even teeth (chiefly Scotland) .... *furvicolor*
Stem without peculiar blackish hue 7

7. T. lt. variable even on same plant (see A 18) .... *cissburiensis*
T. lt. roundish obovate or like those of *foliosus*: a small plant with small panicles (Sprowston Heath, Norfolk) .... *Lintoni*
T. lt. narrow oval, parallel sided (see C 5) .... *apiculatus*
T. lt. ovate or obovate, broader (see C 13) .... *raduloides*

SECTION H.

Fruiting sepals spreading more or less horizontally, armature mixed, leaves not felted beneath.

1.	T. lt. narrowed gradually at each end (often somewhat kite-shaped)	2
	T. lt. roundish	3
	T. lt. obovate, ovate, or oval	5
2.	Panicle very large, stalked glands on panicle purple, long (see D 1)	*Kaltenbachii*
	Panicle narrow cylindrical leafy (Cornwall, common. See D 1)	*Rilstonei*
3.	Leaves large, usually 3-nate, sepals long-pointed, plant often very dark green (see D 43)	*rosaceus*
	Leaves 3-5 nate, small, very hairy below, stem densely hairy, panicle narrow above (see D 34)	*Marshalli*
	Leaves 5-nate or stem only thinly hairy	4
4.	Leaves finely toothed (see D 43)	*infestus*, var. *virgultorum*
	Leaves coarsely toothed, prickles on stem very unequal and scattered	*Koehleri*, var. *cognatus*
5.	T. lt. broadly ovate or obovate, stem roundish, downy (see D 2)	*scaber*
	T. lt. broadly ovate or obovate, stem with blunt angles and hooked or declining prickles (see D 19)	*acutifrons*
	T. lt. oblong oval or obovate, prickles mostly declining (see C 6)	*Babingtonii*
	T. lt. ovate or oval or even diamond shaped, stalked glands on stem numerous and very short, panicle usually much branched but of light appearance because of the slenderness of the long (often interlacing) branches and pedicels and the smallness of the flower and fruit; t. lt. of panicle leaves with cuneate base	*rudis*
	T. lt. obovate, ovate or oval, but plant differing from those described above	6
6.	Stem considerably hairy	7
	Stem glabrous or thinly hairy	14
7.	T. lt. ovate	8
	T. lt. obovate	9
	T. lt. oval (see H 22)	*viridis*
8.	Stem prickles very unequal, chiefly patent (see D 34)	*Marshalli*
	Stem prickles declining, glands on pedicels long (Bellardian) ...	*viridis*
	Stem prickles declining, stem and panicle yellowish (see C 12)	*Leyanus*
9.	Stem and leaves of a yellowish tint, whole plant very prickly (see C 20)	*Borreri*
	Plant not noticeably yellowish	10
10.	Stem roundish densely hairy and glandular (see D 5)	*tereticaulis*
	Stem angled	11
11.	T. lt. with wedge-shaped base	12
	Base of t. lt. not wedge shaped	13
12.	Panicle very large, pyramidal (see D 1)	*Kaltenbachii*
	Panicle cylindrical with well-spaced 2-flowered branches (see D 14)	*thyrsiger*
13.	T. lt. short pointed, roundish obovate	*Drejeri*
	T. lt. with longer often curved point (see D 19)	*Bloxamii*
14.	Stem glabrous or nearly so, prickles nearly equal, panicle narrow above—stem, petioles, petiolules, panicle and all its branches everywhere crowded with bristles and glands ...	*cenomanensis* var. *Bloxamianus*
	Plant not as above described	15
15.	T. lt. variable (see A 18)	*cissburiensis*
	T. lt. obovate	16
	T. lt. ovate	22
	T. lt. oval	27
	T. lt. roundish	30

16. Stem of marked blackish hue, leaflets broad, finely toothed (chiefly in Scotland) .... *furvicolor*
Stem not as above 17

17. T. lt. with long point 18
T. lt. with short point 19

18. Plant strong and very prickly .... *infestus*
Plant small with weak prickles (see C 8) .... *Lintoni*

19. Stem leaves large with soft hair beneath, leaves mostly 3-nate *mucronatus*, var. *nudicaulis*
Stem leaves not very softly hairy beneath 20

20. Stalked glands on pedicels standing out of felt with little or no long hair .... *podophyllus*
Pedicels hairy, often with glands more or less hidden in the hair 21

21. T. lt. roundish obovate (see H 14) .... *cenomanensis*, var. *Bloxamianus*
T. lt. more narrowly obovate, panicle with straggling branches (In the typical plant of the Welsh borders the short stalked terminal flower is overtopped by long lateral branches) ... *mucronatoides*

22. T. lt. short pointed, stalked glands on panicle very long, leaves 5-nate (Bellardian) .... *viridis*
T. lt. long pointed 23

23. Stem yellowish brown with strongly declining prickles (see C 12) *Leyanus*
Stem different 24

24. Leaves softly hairy beneath 25
Leaves thinly hairy beneath 26

25. Prickles on stem very unequal and scattered .... *Koehleri*, var. *cognatus*
Main prickles on angles, often curved and not very unequal, faces with numerous smaller prickles and pricklets .... *infestus*

26. T. lt. roundish, armature Bellardian (see D 40) .... *Durotrigum*
Leaves usually rather small, stem with many usually straw-coloured prickles, some very long straight or curved, panicle larger than that of *R. Marshalli* but like it in having rising or spreading lower branches like lesser panicles, panicle very prickly with long prickles. (The plant from Wales and the borders is often so over-armed with long pale prickles as to look a caricature of a bramble) *Marshalli*, var. *semiglaber*

27. Stem furrowed with few or no stalked glands, stem prickles often red based (see D 48) .... *Borreri*, var. *dentatifolius*
Plant not as above 28

28. Stem blackish purple, leaflet broad, finely toothed (chiefly from Scotland) .... *furvicolor*
Stem not blackish 29

29. Stalked glands on pedicels very unequal, some very long, leaves 5-nate, Bellardian .... *viridis*
Stalked glands on pedicel not Bellardian, stem armature Radulan, stalked glands on panicle standing clear of felt *podophyllus*

30. Leaves thickly hairy beneath .... *Koehleri*, var. *cognatus*
Leaves thinly hairy below (see 26 above) .... *Marshalli*, var. *semiglaber*

SECTION K.

Fruiting sepals rising, erect, or clasping, armature simple, mature leaves felted below.

Stem glabrous, leaves long-pointed (see E 3) .... *opacus*
Stem rather hairy, sepals long pointed clasping the fruit ...... *Salteri*
Stem hairy, leaflets narrow parallel-sided with whitish felt beneath .... *lasioclados*, var. *angustifolius*

SECTION L.

Fruiting sepals rising, erect, or clasping, armature simple, mature leaves not felted beneath.

1. Ripe fruit dark red (see F 2) .... *fissus*
   Ripe fruit black 2
2. Drupelets very few covered with a waxy bloom, stem eglandular but with scattered prickles, stem leaves 3-nate .... *caesius*
   Drupelets more numerous 3
3. Panicle lax, rather glandular with few prickles, with flowers on long pedicels, t. lt. oval or ovate long-pointed, stamens short .... *Sprengelii*
   Panicle lax, rather glandular with long 1 to 2 flowered branches and crowded usually slender prickles, t. lt. oblong or obovate, stamens short .... *lentiginosus*
   Panicle hardly more than a raceme, stamens shorter than styles, t. lt. oval .... *plicatus*, var. *pseudo-hemistemon*
   Panicle well developed with many hooked prickles, leaves small and shining .... *nitidus*
   Panicle long with long patent 1 to 3 flowered peduncles, very sparingly glandular, upper part cylindrical, sepals long and clasping .... *Salteri*
   Plant not as above 4
4. T. lt. short pointed with cordate base (see F 11) .... *calvatus*
   T. lt. with moderately long point, base not cordate (see B 8) ... *caeresiensis*, var. *integribasis*
   T. lt. with longer point 5
5. Terminal flower of panicle often short-stalked, others often on long stalks 6
   Panicle not as above 7
6. Panicle with fairly many stalked glands, and few prickles (a form from Sussex, etc.) .... *lentiginosus*
   Panicle without stalked glands or almost so .... *opacus*
7. Stem furrowed, prickles rather short, panicle usually short and stout, flowers large and showy with long stamens, leaves with coarse compound toothing .... *gratus*
   Stem sometimes rather furrowed, leaves sharply toothed, sepals erect only on young fruit .... *hirtifolius*
   Stem bluntly angled, leaves with irregular toothing, 3-nate or 5-nate, pedate, panicle with fairly many stalked glands (Monmouthshire) .... *orthoclados*

N.B.—*R. sciaphilus*, a plant closely allied to *R. gratus*, is said to differ by its non-furrowed more hairy stem, longer slender prickles, and hairy instead of glabrous anthers. *R. hirtifolius* has sepals erect at first, then reflexed (see B 26).

SECTION M.

Fruiting sepals rising, erect, or clasping, armature mixed, mature leaves felted beneath.

1. Foliage yellowish green, prickles on stem crowded, often curved (see C 20) .... *Borreri*
   Stem yellowish with straight declining prickles (see C 12) .... *Leyanus*
   Plant not noticeably yellowish 2
2. Panicle almost unarmed (see C 6) .... *Boraeanus*
   Panicle more prickly 3
3. Prickles very varied in size, flower red, stem very hairy (see N 7) .... *fusco-ater*
   Prickles not very varied in size, flower paler (see C 6) .... *Babingtonii*

Larger prickles rather uneven, flower paler, panicle with many slender curved prickles, leaves sharply toothed, t. lt. with rather narrow sometimes somewhat cuneate base, sepals long-pointed .... *adenanthus*

SECTION N.

Fruiting sepals rising, erect, or clasping, armature mixed, mature leaves not felted beneath.

1. Stem roundish with scattered prickles, usually with few glands, fruit of few drupelets covered with waxy plum-like bloom, leaves 3-nate .... *caesius*
   Plant not as above 2
2. Drupelets comparatively few or large (caesian) 3
   Drupelets more numerous and smaller 4
3. Stem bluntly angled with few stalked glands, leaves large and thin, fruit very large .... *Balfourianus*
   Stem often with numerous stalked glands, leaves thicker (see note at end of section) .... *dumetorum*
4. T. lt. usually oval but may be ovate or obovate, short pointed, stem roundish (see D 2) .... *scaber*
   Plant not as described above 5
5. Stem considerably hairy 6
   Stem glabrous or thinly hairy 23
6. T. lt. with a long almost triangular point, base often broad and cordate, stem strongly armed with unequal strongly declining prickles .... *adornatus*
   T. lt. not as described above 7
7. Flower red, stem strongly armed with crowded unequal prickles densely hairy (a Midland plant) .... *fusco-ater*
   Flower red, stem densely hairy, main prickles strong and declining but pricklets very small and sunk in the hair .... *obscurus*
   Flower not bright nor deep red 8
8. T. lt. variable but oftenest broadly oval, short pointed, leaves chiefly 3-nate with coarse toothing, stalked glands deep violet or purple, those on panicle often long (Bellardian) ... *hirtus*

   Under *R. hirtus* comes var. *minutiflorus*. Ley's Whitfield (Herefordshire) plant is an enormous plant with 5-nate stem leaves, large oval or slightly obovate t. lt., the panicle broad, lax, pyramidal, with short stalked terminal flower, erect long-pointed sepals and, in the lower part of the panicle, enormous 3-nate leaves with t. lt. as much as five inches long.

   T. lt. oval 9
   T. lt. ovate 12
   T. lt. obovate 17
9. Leaflets narrow and long-pointed, sepals with long and narrow points .... *hostilis*
   Leaflets broader, long pointed, panicle long with glands mostly sunk in dense hair 10
   Leaflets broader, short pointed, armature Bellardian 11
10. Panicle cylindrical with branches fairly equal in length (see C 6) .... *Babingtonii*
    Panicle pyramidal .... *adenanthus*
11. Leaves very large, 3-5 nate, mostly 3-nate, t. lt. roundish oval, panicle with crowded slender prickles .... *rotundifolius*
    Leaves 5-nate of moderate size .... *viridis*

12. Plant strongly armed, stem with scattered varied prickles though the strongest are mainly on the angles, panicle long and narrow with Koehlerian armature, leaflets generally narrow ...... *hystrix*
(A similar plant with broader panicle is var. *bercheriensis*).
Armature weaker, prickles short or slender, panicle lax 13

13. Stalked glands on pedicels very unequal, many very long ...... *viridis*
Stalked glands on pedicel shorter than its diameter 14

14. Panicle often drooping, leafy almost to the top with narrow simple leaves, stem and panicle densely hairy, stem prickles uneven in size ...... *nuticeps* (=*fuscus*, var. *nutans*)
Plant not as above described 15

15. Leaves very broad, ovate or obovate, panicle lax, rather peculiar, with three or four flowers crowded at end of each long branch, stem prickles strongly declining ...... *acutifrons*
(Var. *amplifrons* from Big Wood at Wormbridge, Herefordshire, long the only locality, has broad leaflets on short stalks and overlapping while the panicle is cylindrical with short branches).
Plant not as above described 16

16. Stem very hairy, prickles on stem strongly declining, t. lt. rather narrow, coarsely toothed, stalked glands dark coloured ...... *pallidus*
(Sepals at first erect, then reflexed, as also in *leptopetalus* (see D 17 and 18).)
Stem only fairly hairy, yellowish, stem prickles mostly patent or nearly so, panicle with crowded pale-coloured declining prickles and yellowish hair ...... *hibernicus*
(N. Ireland. A more strongly armed plant is var *dunensis*).

17. Stalked glands on panicle often very long (see D 8) ...... *divexiramus*
Stalked glands on pedicels shorter or plant not Bellardian ... 18

18. T. lt. short pointed 19
T. lt. with fairly long point 22
T. lt. narrow with very long point ...... *hostilis*

19. Whole plant yellowish and very prickly (see C 20) ...... *Borreri*
Plant darker in colour 20

20. T. lt. with wedge shaped base, panicle cylindrical (see D 14) ... *thyrsiger*
T. lt. roundish obovate 21

21. Leaves mostly 5-nate ...... *mucronatus*
Many leaves 3-nate ...... *Drejeri*

22. T. lt. with rather wedge shaped base, stem roundish, very prickly and hairy, prickles scattered and very unequal ...... *Purchasianus*
T. lt. narrowed somewhat to base, stem roundish (Norfolk. See D 5) ...... *tereticaulis*
T. lt. narrow with long point, stem bluntly angled, leaves almost all 3-nate ...... *glareosus*
T. lt. broadly obovate (see D 19) ...... *acutifrons*

23. Leaflets softly hairy below 24
Leaflets not very soft to the touch beneath 25

24. T. lt. oval, rachis and pedicel felted, fruit only partially formed, sepals long pointed, panicle broad, lax, pyramidal *infecundus*
T. lt. oval, rachis almost without felt (see D 48) .., *Borreri*, var. *dentatifolius*
T. lt. roundish obovate, with point only fairly long, stem roundish ...... *velatus*
T. lt. ovate or obovate, long pointed, stem angled, whole plant very prickly ...... *infestus*
T. lt. ovate, stem yellowish-brown with declining prickles (see C 12) ...... *Leyanus*
T. lt. roundish obovate, short pointed ...... *mucronatus*, var. *nudicaulis*

T. lt. broadly oval or obovate truncate (Brecon, Glamorgan, Leicester. See D 23) .... *morganwgensis*

25. Leaves large, usually 3-nate, t. lt. roundish, short pointed, panicle abundantly furnished with glands and prickles .. *rosaceus*

Leaves broadly ovate or obovate (see D 19) .... *aculifrons*

Plant not as above described 26

26. Plant with roundish stem, short prickles and numerous tubercles (see D 2) .... *scaber*

Plant not as above described 27

27. T. lt. typically long, oval, or ovate, with short stalk and long point, prickles on stem very slender, stalked glands on pedicels long, rather yellow or straw-coloured (Bellardian) *serpens*

T. lt. with fairly short point 28

28. T. lt. oval with even toothing leaves 3-nate, glands on pedicels long, red, panicle rather short with patent branches (a scarce woodland plant) .... *Bellardii*

T. lt. ovate or roundish (see H 26) .... *Marshalli*, var. *semiglaber*

T. lt. obovate, truncate-mucronate .... *botryeros*

T. lt. obovate, short pointed, but not truncate .... *longithyrsiger*

R. dumetorum. Every district seems to have its own special forms of *R. dumetorum*, only a few of which have varietal names. Of the more widespread forms, var. *ferox* has a roundish t. lt. and a very prickly almost glabrous stem; var. *diversifolius* has an obovate t. lt. with a very prickly hairy stem; var. *tuberculatus* is known by its broadly oval t. lt. and prickles with large tubercle-like bases; and var. *raduliformis* has considerable resemblance in stem to *R. radula*. Strongly armed forms of *R. dumetorum* are sometimes confused with *Koehlerian* species.

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THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

REPORT FOR 1934

OF THE

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(CONVENIENTLY ABBREVIATED REP. B.E.C.)

BY THE

EDITOR AND DISTRIBUTOR,

N. Y. SANDWITH, Esq., M.A.

VOL. X. PART VI.

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JUNE 1935.

REPORT OF THE DISTRIBUTOR FOR 1934.

THE Club has shown a distinct increase in activity, since 29 members have contributed 2879 sheets in 216 gatherings. Whatever the jaded owners of well-stocked herbaria may feel, the present Editor cannot regard it as a dull Distribution. A number of exceedingly interesting plants were sent in, notably *Geranium pratense*, var. *lilacinum*, *Epilobium adenocaulon* × *palustre*, *Veronica praecox*, *Mentha palustris*, *Potamogeton polygonifolius*, var. *lancifolius*, f. nov. *attenuatus*, and *Carex helvola*; specimens of these and of many others will be welcomed by those in charge of the national collections. Critical genera, especially *Mentha* and *Carex*, are being studied, but there is a falling off in *Euphrasia* and a lack of interest in *Hieracium*, while the Water Buttercups and the Palmate Orchids have been completely ignored. It is to be hoped that more members will take up the study (not merely the collection) of *Rubus*, a genus whose endemic development in Britain is one of the really outstanding phenomena of our flora; the present situation, whether in our handbooks and lists or in our published accounts of the gatherings of British brambles, can hardly be giving a favourable impression to foreign observers.

The discussions on interesting and critical specimens tend to become longer and longer; this is all to the good, and probably represents the best, as it was certainly the earliest, of the activities of the whole Society. The present Distributor hopes that, in these days of quick and easy transport, it will soon be agreed that no uncritical or unvarying species of Bentham and Hooker standard should be sent in any more for exchange. He also wishes that British botanists would fall into line with their contemporaries throughout the world, and would cease to use the expression "the type" when they mean not the type specimen (which they have rarely seen!) but what they believe to be the typical form of the species (this is not, alas, always the common or ordinary form). The expression "the type" should only be applied to the actual specimen or specimens on which the author of the species based his original description.

Another reflection which inevitably arises from the handling of so many hundreds of labels is how backward is the present condition of the nomenclature current among British botanists; the reason being that they are relying on a List and Catalogue which either did not seriously follow, or did not critically apply, the International Rules of Nomenclature. The names of British plants should be revised by a competent botanist who is willing to study all the academic intricacies of the Rules as altered at the Cambridge Congress, and who will compare our current names both of genera and species with those used in standard Continental floras. In many instances our specific names are invalid, while our generic segregation is sometimes strangely out-of-date. Such a revision would naturally be a long and difficult task, and would require the collaboration of experts in various groups; it would be one of the duties of the authors of a new British Flora, but it might well be undertaken previously and the results published in the form of a new List. Whatever may be said about this, it will surely be agreed that our present Lists are very unsatisfactory and ignore not merely the painstaking researches of nomenclatural experts but also what appears to be a more enlightened scientific attitude towards certain genera. It is believed that, by constant repetition and writing, a revised nomenclature of the British flora would quickly become both familiar and inoffensive; sentimentality and prejudice would not, of course, stand in the path of the progress of members of this Club!

All the Exchange members will mourn the loss of Mr J. Fraser and Mr J. E. Little, who had been valued contributors and critics for many years. Mr Fraser's mastery of *Mentha* and *Salix* inspired confidence; it was so far in advance of that of any other British botanist, and the Club had relied on him for so long, that we cannot hope to fill his place, above all as a critic of Willows, for many seasons.

The thanks of the Club are due to the following botanists for their kind help: Mrs H. Drabble, Rev. H. J. Riddelsdell, Col. A. H. Wolley-Dod, Messrs G. M. Ash, E. B. Bishop, C. E. Britton, P. M. Hall, W. H. Pearsall, H. W. Pugsley, and A. E. Wade; Messrs A. J. Wilmott, A. H. G. Alston and A. Bruce Jackson, of the British Museum; and the Distributor's colleagues at Kew, Dr W. B. Turrill, Messrs J. S. L. Gilmour, H. K. Airy-Shaw and E. Nelmes, and Mr C. E. Hubbard who has contributed some valuable notes on the Gramineae.

N. Y. SANDWITH.

The Herbarium,
Royal Botanic Gardens,
Kew, Surrey,
30th April 1935.

LIST OF PARCELS RECEIVED.

	No. of Sheets.	No. of Gatherings.
G. M. Ash	44	4
P. G. Beak	41	3
Prof. K. W. Braid	20	1
C. E. Britton	169	12
G. C. Brown	149	13
Preb. R. J. Burdon	93	6
J. Chapple	135	10
Prof. B. H. Danser	47	1
E. S. Edees	28	3
H. Foster	40	4
†J. Fraser	207	14
J. D. Grose	114	8
P. M. Hall	281	16
Col. H. Halcro Johnston	59	3
R. Knowling	41	4
†J. E. Little	11	1
J. W. Long	85	8
J. E. Lousley	267	18
R. Melville	44	3
W. H. Pearsall	63	5
F. Rilstone	68	6
R. W. Robbins	43	4
Miss I. M. Roper	23	2
W. A. Sledge	64	5
H. S. Thompson	119	19
National Museum of Wales	55	5
E. C. Wallace	413	23
W. Watson	72	11
A. Wilson	64	4
	2879	216

Papaver lateritium Koch. Limpsfield, Surrey, August 1933. A garden weed in the district. Flowers light brick-red.—R. W. ROBBINS. "*Papaver lateritium* C. Koch is a native of Armenia and was originally described from material cultivated in Berlin. It is now common in gardens, but it does not appear to have been figured beyond the black and white figures of leaf and capsule in the *Pflanzenreich*, iv, 104, 361 (1909), where also a description and bibliographical references will be found. The specimen received from Mr Robbins does not agree over-well with wild material at Kew, but the differences may be due to the effects of cultivation. Ripe fruit and seeds should have been included in the material distributed."—TURRILL.

Barbarea verna Asch. Railway embankment near Appleby, Westmorland, v.-c. 69, June 1, 1934. (Ref. No. 12).—W. A. SLEDGE.

Barbarea intermedia Bor. Lower Birtley Farm, Witley, Surrey, July 1934.—G. M. ASH.

Arabis Turrita L. Garden, Newport, Isle of Wight, August 1933.—J. W. LONG.

Draba muralis L. Manifold Valley, N. Staffs, June 9, 1934.—E. S. EDEES.

Erophila verna Meyer, var. *hirtella* Jord. Sandy field, Old Swindon, Wilts, v.-c. 7, April 30, 1934 (Ref. No. 633).—J. D. GROSE. "Certainly not *E. verna*, var. *hirtella* (Jord.) in the sense of O. E. Schulz, *Pflanzenr.*, iv, 105, 353 (1927). It appears rather to be the var. *cabillonensis* (Jord.) O. E. Schulz, e descr. *l.c.*"—TURRILL.

Diplotaxis muralis (L.) DC., var. *Babingtonii* (Syme). By the sides of the railway, between Freshfield and Ainsdale, near Southport, S.W. Lancashire, September 21 and 22, 1883.—Coll. CHARLES BAILEY, Manchester. Comm. by J. CHAPPLE. "Syme's name, which was published in the third edition of *English Botany* as a variety of the subspecies *muralis* of *Brassica brevipes*, is antedated both by the var. *caulescens* Kittel (1844) and the var. *ramosa* Neilr. (1846)."—ED.

Viola lactea Sm. × *Riviniana* Reichb. Stoborough Heath, Dorset, v.-c. 9, May 20, 1934 (Ref. No. 1056). These specimens illustrate quite well the combination of the characters of the parents but it is impossible in dried specimens to do justice to the beauty of this plant, which grows in large and very floriferous clumps.—P. M. HALL.

Viola hirta L., forma. Copse of conifers, Fleam Dyke, Cambs, May 5, 1934 (Ref. F.28). I have been observing this violet, which seems to have some affinity with *V. calcarea* Gregory (whatever that species may be worth), for several years. In leaf shape it agrees well with specimens of *V. hirta*, f. *pinetorum* Wiesbaur, collected by the author at "Kalksburg bei Wien" in 1877 and in my herbarium, but these authentic specimens have much larger flowers which (contrary to the description) mostly exceed the leaves, and a looser habit than the Fleam Dyke plants. On some of my specimens gathered last year P. M. Hall wrote, "This is a rather unusual form of *hirta* with the leaves overtopping the small flowers; but I am not prepared to go so far as to say that it is var. *pinetorum*. The stipules should be longer for that var. It looks to me like a shade form." It should be noted that the character "stipules 2-4 cm." was added by Neuman (*Sveriges Flora*, p. 269 (1901)), and that Wiesbaur treated his plant as a "form"—it being raised to varietal rank by Beck (*Fl. Nieder-Österr.*, p. 511 (1893)).—J. E. Lousley. "This gathering exhibits some differences from the normal forms of *V. hirta*, more especially in the outline of the leaves; some leaves are narrower, some more triangular in shape and less deeply cordate at the base (in some cases almost truncate) than is usual in British specimens. It is possible that this plant when fully developed might come under var. *pinetorum* Wiesbaur, but the stipules do not appear to be long enough for that variety and I consider that any peculiarities, which this gathering may have in outline of leaf and size of flower, are only such as are to be expected in shade-grown plants approaching the cleistogamous state."—Hall.

Viola hirta L., var. *propera* (Jord.) Gill. Minster Lovell, Oxon, April 20, 1934.—J. Chapple. "Correct."—Hall.

Viola lutea Huds. Lamancha, Peebles-shire, July 7, 1934.—R. J. Burdon. "Quite typical."—Hilda Drabble.

Silene maritima With. From an inland low-level station (175 feet), near Bettws-y-Coed, Caernarvonshire, v.-c. 49, September 1, 1934.—A. Wilson. "The occurrence of isolated inland populations of *Silene maritima* is a matter of some importance. One such population, from Red Scar, west of Richmond, Yorkshire, has been fully analysed and the results are to be published later in the series of papers on *Silene* appearing in the *Kew Bulletin*. It is probable that some of these inland populations are of a relict nature and represent a formerly more continuously widespread distribution of the species. It seems, from the great mass of data now accumulated for this species and for *S. Cucubalus* (*S. vulgaris*), that *S. maritima* survived the Ice Age or Ages in the British Isles, while *S. Cucubalus* was probably introduced, many times, after the last Ice Age. It is unfortunate that the material recorded at the head of this note has no ripe fruits and seeds. Specimens and seeds of *Silene* will be gratefully received by the writer, who, with a colleague, is making an intensive study of the genus."—Turrill.

Cerastium pumilum Curt. Banstead Downs, Surrey. Ref. No. F.34a, May 1933, and Ref. F.34b, May 1934. Conspicuous on a bright day from the star-like flowers and reddish colour of the plants.—J. E. Lousley.

Stellaria neglecta Weihe. Roadside bank east of Stanton Drew, N. Somerset, May 15, 1934.—H. S. THOMPSON.

Arenaria serpyllifolia L., var. *scabra* Fenzl. Calbourne, Wight, v.-c. 10, June 15, 1934. (Ref. No. 1098). A slender eglandular plant found growing in crevices of a stone wall and hanging down in long trailing mats.—P. M. HALL.

Arenaria serpyllifolia L., var. *sphaerocarpa* Tenore. Winspit, Worth Matravers, Dorset, v.-c. 9, May 20, 1934. (Ref. No. 1048). A stout and densely glandular plant from exposed maritime turf, the correct varietal name of which is doubtful. It seems to me to come best under *sphaerocarpa* Tenore which, according to Drabble, *Journ. Bot.*, lxviii, 372, 1930, is the glandular counterpart of the eglandular *macrocarpa* Lloyd. It is doubtful, however, whether the capsules and seeds of my plant, though certainly larger than normal (cf. my Ref. No. 1098), are large enough to admit it to the grade of *macrocarpa* and therefore of *sphaerocarpa*, if Drabble's measurements are to be adhered to exactly. This plant, however, would appear to agree well with the original description of Tenore, except in regard to " caulibus erectis " and the procumbent, rosetted habit may in this instance be due to exposure. Of the other glandular forms dealt with by Drabble, *viscidula* Roth may be ruled out, being a small, slender form : this leaves us with *glandulostricta* Drabble, the glandular counterpart of *stricta* Towns. This is a stout plant with dense inflorescences at the ends of the branches but there is no mention in the descriptions of either var. of larger capsules or seeds than in the type. In a near but distinct and slightly less exposed habitat were seen some eglandular but otherwise exactly similar plants.—P. M. HALL. " This has not the indumentum of authentic specimens of *A. sphaerocarpa* Ten. in Herb. Mus. Brit. The glandular clothing is that of the var. *viscidula*. The habit is due to conditions of growth, and may not exclude it from being var. *viscidula* Roth. The capsule is as large as in *A. sphaerocarpa* Ten. and *A. Lloydii* Jord."—WILMOTT.

Spergularia salina Presl. Chichester, W. Sussex, v.-c. 13, June 1916.—Coll. G. C. DRUCE. Comm. J. CHAPPLE. " My sheet of this is *S. marginata* Kittel. The large capsules on long pedicels, and exceeding the sepals, rule out *S. salina*. As the seeds are wingless it is var. *aptera* E.S.M."—WALLACE. " This is *Spergularia marginata* Kittel, var. *aptera* (E. S. Marshall in *Journ. Bot.*, 268, 1901, sub *Lepigonum*). The woody stem, larger size, habit, pale petals, etc., distinguish this plant at a glance from any form of *salina* in spite of the apterous seeds. Moss considered Marshall's plant a possible hybrid of the two species, but the present specimens could scarcely be so referred."—LOUSLEY.

Tamarix gallica L. On the edge of the sand dunes, Rose, Perranporth, West Cornwall, October 1, 1934. Davey's *Flora of Cornwall*, like most books in general use, gives the flowering period as July to September. These bushes, as will be noticed, were only just coming into flower on October 1.—F. RILSTONE.

Geranium pratense L., var. *lilacinum* Celak. Origin: Banks of R. Avon, Rock Meadow, Bubbenhall, v.-c. 38, Warwickshire.—J. GRIMES. Now extinct owing to destruction by flood. Cult: Cardiff, Glam., July 1934.—A. E. WADE. Comm.: DEPT. OF BOTANY, NATIONAL MUSEUM OF WALES. Note: The flowers tend to darken somewhat in drying. "Apparently a new name to the British Flora. Most authors of the larger floras of neighbouring countries mention that the flowers of *G. pratense* may occasionally be lilac, but do not introduce a special name. Is there any reason to suppose *lilacinum* more than a casual colour form?"—LOUSLEY. "Celakovsky distinguished it merely by the "wässerig-lilafarben" flowers. He found it only in Eastern Bohemia, mainly on calcareous marl; in one locality it was the only form seen, in another it was growing with the typical plant."—ED.

Geranium purpureum Vill. Waste ground, Wookey Hole, N. Somerset, v.-c. 6, August 20, 1934. Flowers small. Anthers yellow.—IDA M. ROPER. "An untypical (? shade) form, but apparently correct, judging from flowers and indumentum. Fruits not well developed."—WILMOTT.

Erodium maritimum Smith. In great abundance on a limestone hill to the south-west of the Little Ormes Head, Llandudno, N.E. Caernarvonshire, September 17 and 27, 1879. Coll. CHARLES BAILEY, Manchester. Comm. by J. CHAPPLE.

Medicago falcata L., var. *diffusa* Schur. Waste ground by Isis Hotel, Iffley Lock, Oxford, v.-c. 23, September 17, 1933. (Ref. No. Z.601). Diffuse bushy herb. Flowers rich yellow. Pods dark brown.—P. G. BEAK. "Yes, var. *diffusa* Schur. see *Rep. B.E.C.*, 21, 1926. The var. *procumbens* Bess. has a very similar habit, but differs chiefly in its larger leaflets, and has also been reported from Britain (*Rep. B.E.C.*, 281, 1918, and C. E. Salmon, *Fl. Surrey*, p. 230 (1931))."—LOUSLEY. "This is the alien plant with almost straight pods which has been named var. *tenuifoliolata*. Schur describes the pods of var. *diffusa* as falcate."—WILMOTT. "This is one of the small-leaved alien forms of *Medicago falcata* with only slightly curved pods which occur in many parts of Britain. The forms of this species show almost every combination of characters (see genetical and agricultural literature), and it is therefore difficult to fit individual plants with any certainty to any definite name. This gathering seems to come under the description of var. *diffusa* Schur."—GILMOUR.

Trifolium hybridum L., var. *elegans* (Savi). Ware, Herts, September 1928.—Coll. G. C. DRUCE. Comm. J. CHAPPLE.

Lathyrus sylvestris L. Sharkham Pt., S. Devon, July 4, 1934.—H. FOSTER.

Lathyrus Nissolia L. Matfield, W. Kent, July 27, 1934.—W. H. Pearsall. "Foreign authorities have divided this species into two subspecies or races:—(a) *genuinus* Uechtr. Pods shortly hairy. Leaves 6-8 mm. broad. (b) *gramineus* Freyn. Pods glabrous. Leaves about 3 mm. broad. Each of these has considerable synonomy. The former is the usual plant of W. and S. Europe, the latter of Eastern Europe and N. Germany. Mr Pearsall's examples, like most of the specimens of this common plant of Southern England in my Herbarium, comes under *gramineus.* While I am not convinced that the distinction can be satisfactorily applied in this country, it might well be worth while to work out the distribution of the forms for phytogeographical purposes."—Lousley.

Rubus nitidus Weihe & Nees, var. *albiflorus* Weihe? Danbury Common, S. Essex, v.-c. 18, July 7, 1934. (Ref. No. 2496). Petals white, stamens equalling styles, sepals patent in flower, reflexed in fruit. Apparently identical with my Ref. No. 1489 from the same spot in 1919, but the drought conditions here have been extreme this year.—G. C. Brown. "I should say so."—Riddelsdell. "*R. nitidus.*"—Watson.

Rubus rhodanthus W. Watson. Ashtead Woods, Surrey, v.-c. 17, July 28, 1934. Petals obovate, rose pink. Stamens deep rose pink at base, pink above, twice as long as the pinkish styles. Anthers reddish, pilose. Young carpels pilose. Syn.: *R. carpinifolius*, var. *roseus* W. & N., *R. rhombifolius* auctt. plur. non Whe.—W. Watson. "Too overdeveloped for me to criticise."—Riddelsdell.

Rubus Banningii Focke. Cultivated, from Eltham, W. Kent, v.-c. 16. Petals pink, oval-obovate. Stamens white, exceeding the reddish styles. Carpels subglabrous. Robust with large showy flowers. Panicle branches racemose, not cymose. True from seed.—W. Watson. "Focke's plant has eglandular stems. This plant has abundant glands on stem. I have no specimen of Focke's to consult, but it is difficult in view of the description to place Watson's plant here. The suggestion I prefer is that of a *rhamnifolius* hybrid."—Riddelsdell.

Rubus cardiophyllus L. & M., a small genetic form. Milford Heath, Surrey, v.-c. 17, September 1934.—W. Watson. "*R. cardiophyllus* as described by Mueller has very coarse nettle-like toothing; and (apparently) not a very long-stalked terminal leaflet. These sheets come between *rhamnifolius* and *cardiophyllus*, as does most of our English '*rhamnifolius*'."—Riddelsdell.

Rubus Salteri Bab. Ex Apse Castle Wood, I. of W., v.-c. 10, cultivated at Bickley. I do not find the plant stoloniferous as stated by Salter, and it is clear that it belongs to the *Silvatici.* Petals narrow obovate notched incurved, pure white. Stamens white, slightly longer than the yellowish-green styles, connivent. Carpels glabrous.—W.

WATSON. "No doubt the true *Salteri* from the original locality."—RIDDELSDELL.

Rubus egregius Focke (typical). Boars Hill, Berks, v.-c. 22, July 21, 1934. Petals white. It grows in and near a hedge between Boars Hill village and the Fox Inn; and there is a large bush on the north slope of Boars Hill at the back of the Post Office.—W. WATSON. "Not quite the Continental type, as Rogers (*Handb.*, p. 34) points out. It may come under the name *egregius* or *bracteatus* Bagn., the latter ranking now as a variety of *egregius*. I have seen *egregius* from a number of English counties, but never quite in typical form."—RIDDELSDELL.

Rubus mucronatus Blox.? Embankment of the Roman Road, Berechurch Park, N. Essex, v.-c. 19, July 15, 1934. (Ref. No. 2503). Petals white, stamens much exceeding styles, sepals patent in flower and later. —G. C. BROWN. "No! A *leucostachys* hybrid."—RIDDELSDELL. "*R. Drejeri* G. Jensen (forma *homoeacantha*)."—WATSON.

Rubus Gelertii K. Frid. Old Park Wood, Plumstead, W. Kent, v.-c. 16, July 29, 1934. Petals obovate, faintest pink to white. Stamens white, anthers cream, slightly longer than the ivory styles. Carpels glabrous. Sepals ± reflexed during and after flowering.—W. WATSON. "A neat plant which it is tempting to place under *Gelertii*, but critical examination will not allow it. See especially the 3-nate leaves very strigose above with toothing quite different from Friderichsen's robust 2 sheets in my herbarium; and the absence of dense tomentum, etc., on the panicle. The glandular development has a different look, too."—RIDDELSDELL.

Rubus setulosus Rogers. Danbury Common, S. Essex, v.-c. 18, July 7, 1934. (Ref. No. 2501). Petals white, sepals patent in flower, then rising, stamens red at base, exceeding styles.—G. C. BROWN. "The Wye Valley plant is far less glandular, and has strongly felted young leaves, and bright red stems. Brown's plant lacks these and other points, though its resemblances are considerable, and apparently its connection is close."—RIDDELSDELL. "*R. hystrix* Wh."—WATSON.

Rubus Bloxamianus Coleman. Cultivated, ex Tunbridge Wells, W. Kent, v.-c. 16. Petals pinkish. Stamens white, not much longer than the honey-coloured styles. Anthers cream, slightly pilose. Sepals patent in flower then reflexed, but soon becoming patent again and remaining so. Bagnall says that the petals are white; I have always found them pinkish, viz., at Tilburstow (Surrey), at Bostall Woods (North Kent), at Arnos Grove (Middlesex) and at Tunbridge Wells. —W. WATSON. "The peculiar glandular development of *Bloxamianus* and its very narrow, long, interrupted panicle are wholly missing here. The gathering is more akin to *rudis* with which it should be compared." —RIDDELSDELL.

Rubus fuscicortex Sud. Syn. *R. podophyllus* Rogers, non P.J.M. Coombe Wood, Wimbledon Common, Surrey, v.-c. 17, August 1934. Petals pink. Stamens white, equalling the reddish-based styles.—W. WATSON. "This highly glandular plant with its predominantly 5-nate leaves does not fit the description in Sudre, nor the Festiniog plant from which Sudre drew up the description."—RIDDELSDELL.

Rubus fuscus Wh. & N. ? Danbury Common, S. Essex, v.-c. 18, July 7, 1934. (Ref. No. 2502). Not typical but apparently under this. Petals pink, sepals reflexed in flower, then rising, exceeding styles, leaves very soft.—G. C. BROWN. "Not *fuscus*, though related to *fuscus* and *foliosus*. I cannot give an exact name."—RIDDELSDELL. "*R. hystrix* Wh."—WATSON.

Rubus uncinatus P.J.M. non Rogers. Cultivated, ex Tooting Common, Surrey, v.-c. 17. Petals pinkish, notched at apex. Stamens white, slightly longer than the yellowish styles. *R. uncinatus* Rogers = *R. fuscus*, var. *macrostachys* Rogers. The cause of the confusion seems to be that *R. uncinatus* P.J.M. grows mixed with *R. macrostachys* P.J.M. at Wissembourg, the classic station for each species. Focke must have gathered *R. macrostachys* there in mistake for *R. uncinatus*, as he identified the Troy Park Wood similar (but not identical) *R. macrostachys* as *R. uncinatus*. Rogers called all the Dorset and the Branksome "*R. macrostachys*" *R. anglicanus*—see his remarks in the Mansell-Pleydell Herbarium in the Dorchester Museum—and no doubt showed some of this to Focke as "*R. anglicanus*," as Focke says that *R. anglicanus* = *R. macrostachys*.—W. WATSON. "Not at all like Mueller's plant, of which I have seen one of Mueller's own 1858 specimens. The hooked prickles of stem and rachis seem to have misled W. Watson. This gathering is much more like the *Colemanni* of Surrey, but has a great appearance of hybridity, especially in the curious leaves."—RIDDELSDELL.

Rubus horridisepalus Sud. Cultivated, from Bigberry, Canterbury, E. Kent, v.-c. 15. Petals white, stamens white, slightly exceeding the greenish styles. Sepals patent to erect after flowering. Sepals green, white-bordered, glandulose and aculeolate. Habit of *R. gratus* and *R. chaerophyllus*. Fruit large, perfected.—W. WATSON. "I have no authentic specimen of *horridisepalus* to go by, and can give no opinion."—RIDDELSDELL.

Rubus rosaceus Wh. & N., aggr.? By the Roman Road, Berechurch Park, N. Essex, v.-c. 19, July 15, 1934. (Ref. No. 2504). A large and luxuriant bush. Petals white, stamens exceed styles, sepals patent in flower, closely reflexed in fruit.—G. C. BROWN. "May be right; I have no continental specimens to compare. But I should expect a much broader panicle."—RIDDELSDELL. "*R. scabripes* Genev."—WATSON.

Rubus dasyphyllus Rogers, forma? Gravel pit, Friday Wood, Berechurch, N. Essex, v.-c. 19, July 31, 1934. (Ref. No. 2505). Petals pink, sepals patent in flower and after, eventually rising, stamens exceed styles. The panicle leaves are felted and the panicles more slender and longer than usual, but it is somewhat shade grown.—G. C. BROWN. "Not *dasyphyllus*, but quite possibly a hybrid of it."—RIDDELSDELL. "*R. scabripes* Genev."—WATSON.

Rubus Schleicheri Weihe. Cultivated at Bickley from seed obtained from a station between Tunbridge Wells and Hawkenbury, W. Kent, v.-c. 16, where it grows in fair quantity under hedges. Petals narrow, obovate, pink. Stamens white, equalling or some exceeding the white (rosy-based) styles. Sepals reflexed in flower (July 6), gradually patent after flowering, dropping to loosely reflexed when the fruit is deep crimson (August 23). It extends to Crowborough, E. Sussex, v.-c. 14.—W. WATSON. "In the light of 5 sheets in my herbarium this seems right; the only points of difference from type lying in the far less hairy stems, and the shorter ultra-axillary part of panicle. The name may thus be introduced into the British *Rubus* list; it will probably be found that we have it in our herbaria already from other localities, most likely as a form of *serpens*."—RIDDELSDELL.

Rubus sp. Blackburn, Jedburgh, July 23, 1934.—R. J. BURDON. "Apparently *R. nemoralis* (or *R. macrophyllus*), var. *glabratus* Bab., as conceived by Rogers. But what material!"—RIDDELSDELL. "*R. Schentzii* Lindeb."—WATSON.

Rubus sp. Danbury Common, S. Essex, v.-c. 18, July 7, 1934. (Ref. No. 2500). Petals white, sepals patent in flower, leaves very soft, light green. This seems to be the same (though not from the same bushes) as my Ref. No. 1521, July 31, 1919, on which Rev. H. J. Riddelsdell wrote, "It cannot be *anglicanus* but it fits fairly well to *podophyllus* if you can admit so much hair and felt," but later (July 30, 1920) he says, "I cannot get beyond Radulan." These specimens are young.—G. C. BROWN. "This plant has clearly puzzled me in the past, but with Jensen's original description before me I feel fairly confident in assigning it to *R. Drejeri*. None of the continental or English specimens in my herbarium shows a *dense* clothing of acicles and glands on the stem, as they should. This specimen, however, is on the small side."—RIDDELSDELL. "*R. criniger* Linton."—WATSON.

Rosa stylosa Desv., var. *systyla* (Bast.) Baker, f. *lanceolata* Lindl.? Bampton, Oxon, August 1934. (Coll. No. Z.693).—P. G. BEAK. "Although a few fruits in these gatherings might well pass as subglobose, the majority incline too much to ovoid to fit *lanceolata*. If my only choice were between that f. and *systyla* I should prefer the latter. But, in my opinion, these spreading to suberect sepals entitle it to pass as *cristata*, a rather weak form, weak, that is, in symmetry of the "crest" which is the distinctive character of that variety. I should label it *Rosa stylosa* Desv., var. *cristata* W.-Dod. N.C.R. for v.-c. 23, which is but the fourth v.-c. from which it has been recorded."—Bishop. "Certainly not var. *lanceolata* but it may go under var. *cristata* with Bishop's reservations. Few of the sepals are really suberect, as they all are in the two specimens in my herbarium."—Wolley-Dod.

Rosa canina L. [var. *Pouzini* (Tratt.)], f. *Wolley-Dodii* Sudre. Cooper's Hill, Runnymede, Surrey, v.-c. 17, September 11, 1932, and July 2, 1933. (Ref. No. 284). Please note two gatherings, the older to show the long, exserted column of styles, and the younger to get better leaves, which fall early in this variety.—J. Fraser. "Seen by Col. Wolley-Dod from this locality and certainly correctly named. It is a Rose with which I am not well acquainted, and I had no idea that its leaflets ever attained the size of the largest of those of some sheets before me."—Bishop. "Yes, f. *Wolley-Dodii.* The leaflets in the majority of the specimens are about of normal size. I have written separate slips on two sheets which have them larger than usual, but even here they are not so large as I have seen on specimens from the *locus classicus* on Ham Common."—Wolley-Dod.

Rosa canina L., var. *hirtella* Chr.? (See *Rep. B.E.C.*, 1933, p. 525.) Vigorous, very prickly bush, 8 feet high. Bampton, Oxon, August 1934. (Coll. No. Z.541).—P. G. Beak. "For those who adopt the nomenclature, etc., of Wolley-Dod's *Revision,* this must be called *R. canina* L., var. *verticillacantha* (Mér.) Baker, f. *Lemaitrei* (Rip.) W.-Dod. For those inclined to segregate further, following Keller, it comes under var. *hirtella* Chr. In Keller's *Synopsis* the assemblage of Roses which corresponds to Group *Andegavenses* (of Wolley-Dod) is sub-divided, primarily by serration, and var. *hirtella* embraces 19 of his 22 weakly biserrate (or *Transitoriae*) formae. I prefer not to segregate still further into any particular f., but to leave this gathering under aggregate *hirtella*."—Bishop. "I have not yet adopted the name of f. *hirtella* Chr., a name which hitherto has only been applied to specimens from this bush, and, wrongly, to a form of var. *Pouzini,* f. *Wolley-Dodii.* Apart from this I should hesitate to say whether the specimens under this number, taken collectively, can be considered as other than simply serrate, though some of the more biserrate examples might be graded into a *Transitoriae* Group of the *Andegavenses* if such were adopted. Keller has a similar Group in practically all his Roses and their leading varieties, and the question as to whether it is wise to follow this is too wide a one to discuss in this Report. Personally, I should label these *R. canina*, var. *andegavensis*, f. *agraria*, a form approaching, in respect of some of the specimens, var. *verticillacantha*, f. *Lamaitrei*, but this is not constant, and my decision is based on consideration of the average of the gathering, not on certain individuals."—Wolley-Dod.

Rosa Afzeliana Fr., var. *glaucophylla* W.-Dod. Warlingham, Surrey, September 13, 1934. (Ref. No. 4169).—C. E. BRITTON. "Yes, *Rosa Afzeliana* Fr., var. *glaucophylla* (Winch) W.-Dod, from a new (and third) Surrey station. By comparison with my bush on Dunsfold Common, that of Warlingham has smaller leaflets, and fruit usually more approaching subglobose, whilst its sepals are not so persistent as on my even riper fruit. Also its prickles are less stout, and its habit (apparently) less robust. I have my theory that this welcome settler in Surrey is the product of seeds voided in autumn by southward migrating birds."—BISHOP. "Correct. A very rare rose in all the south-east counties."—WOLLEY-DOD.

Rosa tomentosa Sm., var. *scabriuscula* W.-Dod. Farley, Surrey, September 25, 1934. (Ref. No. 4172).—C. E. BRITTON. "Unlike any specimen of var. *scabriuscula* Sm. (or indeed of any member of the *Tomentosae*) either in my herbarium or in my experience, but I can make no better suggestion. Its general appearance does not strike me as quite *tomentosa*-like, neither do these small to very small leaflets. As is usual when puzzling over *Villosae*, Keller's *Synopsis* gives me no help."—BISHOP. "This is *R. tomentosa*, var. *scabriuscula* Sm. I agree that the leaflets are decidedly small, but I can match them by three or four specimens in my herbarium, and there is little else to take it off that variety."—WOLLEY-DOD.

Pyrus Aria L. Whim Lamancha, Peebles-shire, July 5, 1934.—R. J. BURDON. "I think Hedlund would call this *Sorbus incisa* (Rchb.). It is not typical *S. Aria* (L.) Crantz."—WILMOTT.

Tillaea aquatica L. Shores of Adel Dam, near Leeds, v.-c. 64, July 11, 1934. (Ref. No. 14).—W. A. SLEDGE. "The genus *Tillaea* is now merged in *Crassula*, and our British species will in future be known as *Crassula aquatica* (L.) Schoenl. and *C. muscosa* (L.) Roth."—ED.

Cotyledon Umbilicus-Veneris L. Hedgebank near Frensham, in Headley parish, N. Hants, v.-c. 12, July 8, 1934. (Ref. No. 1226). A small gathering to vouch for the occurrence of this species in v.-c. 12. Townsend, *Flora of Hants*, ii, 167, 1904, gives two records, one at Ropley, 1890, but not seen the following year, and the other an early record for Headley Parish. This authority is quoted by the Second Supplement of *Topographical Botany*, but I have seen no other record for N. Hants. The plants now distributed came from a considerable colony on the banks of a sandy lane in Headley Parish, near Frensham, and only a few yards on the west side of the Hants-Surrey boundary.—P. M. HALL. "This plant, scarce on the eastern side of Britain, occurs also in Surrey, near Frensham."—WALLACE. "We must surely learn to call this *Umbilicus pendulinus* DC., since our plant, by modern taxonomic standards, is generically distinct from the African genus *Cotyledon*."—ED.

Epilobium obscurum Schreb. × *parviflorum* L. Kitchen garden, Lower Birtley Farm, Witley, Surrey, August 1, 1933. (Ref. Ep. 88). —G. M. Ash.

Epilobium Lamyi F. Schultz. Cult., Kew, from Beaconsfield, Bucks, v.-c. 24, July 11, 1934. A short-petioled form. It produces good autumnal rosettes when the rainfall is average, and that is the only part that lives after fruiting.—J. Fraser. "In my opinion most of these plants are *Epilobium tetragonum* L. sec. Curt.; I have labelled the two or three sheets which I think are not. The parallel sides and numerous small teeth to the leaves, the limbs of which are noticeably decurrent, are characters of *Epilobium tetragonum* and not of *Epilobium Lamyi* Schultz. The length of the pods and the seeds too agree with *Epilobium tetragonum*. The colour of the plants is due to richer or looser ground. I have a specimen of *Epilobium Lamyi*, Cult., Kew, from Beaconsfield, Bucks, gathered by Mr Fraser on July 11, 1931, which is very different from the plants distributed this year, and I can only suggest that there has been some mistake."—Ash. "Yes, *E. Lamyi*; see the cylindrical stem closely downy in the upper part, the deep green, opaque, shallowly denticulate leaves, with lamina not decurrent on the stem, and the deeply-coloured flowers."—Watson. "Most of these specimens were surely *E. tetragonum*, in contrast, as Mr Ash notes, to a former cultivated gathering of Mr Fraser's which was correctly named *E. Lamyi*." —Ed.

Epilobium adenocaulon Hausskn. Pond edge, near Worplesdon, Surrey, August 21, 1934. (Ref. Ep. 154).—G. M. Ash. "A paper on the appearance of this North American species in Britain and on the Continent has been written for the *Journal of Botany*."—Ed.

Epilobium adenocaulon Hausskn. × *palustre* L. Edge of Fleet Pond, N. Hants, July 23, 1934. (Ref. Ep. 133).—G. M. Ash.

Epilobium anagallidifolium Lam. Calcareous spring at 2450 feet, from Yoredale Limestone strata, west side of Great Dun Fell, Westmorland, v.-c. 69, July 11, 1931.—A. Wilson.

Falcaria vulgaris Bernh. (=*Prionitis Falcaria* Dumort.; *Falcaria Falcaria* Karsten; *Falcaria Rivini* Host, etc.). Near North Foreland, East Kent, August 11, 1934. (Ref. F.19). Although previously recorded from another locality in Kent, and one in Hants, probably the first British record of this as permanently established was from Preston, near Wingham, Kent, where it was found by G. Dowker in 1858 (*Journ. Bot.*, 1889, 272), and where it was still growing in 1890 (Hanbury & Marshall, *Fl. Kent*, p. 164). The present gathering was from a locality to which I was directed by Mr A. H. Carter where the plant grew by the side of a "green road" in the same corner of Kent as Dowker's station. It now seems well established in Oxfordshire, Berks, Herts, and Kent, and the species well deserves a place in our Floras. Several observers have remarked that *Falcaria* never appears to ripen fruits in this country. Many of the specimens distributed exhibit formed fruits, which, however, appear to shrivel up and drop off before maturity. All the stations known to me are on calcareous soils.—J. E. LOUSLEY.

Selinum Carvifolia L. Chippenham Fen, Cambs. (Ref. F.18). Flowers, August 19; fruit, October 11, 1934. This plant is now known from N. Lincs, Notts, and Cambs. It was first recorded for Britain from Lincs by Lees (*Rep. Bot. Record Club*, 1881), fuller notes appearing in *Proc. Manchester Lit. and Phil. Soc.*, 1882/3, p. 44, and *Journ. Bot.*, 1882, 129, plants being distributed through the B.E.C. in 1882. At the same distribution Ar. Bennett distributed specimens from Fordham, Cambs—by which the present station was intended. Here he did not consider the plant native (*Journ. Bot.*, 1899, pp. 244 and 359), but his doubts were well answered by Lees (*Journ. Bot.*, 1899, p. 326), and Druce (*Rep. B.E.C.*, 1903, 19). The species has also been found by Prof. J. W. Carr near Mansfield, in Notts (*Journ. Bot.*, 1909, 71). At Chippenham the plant is probably quite as abundant as it ever has been, and this dry summer rather strangely seemed to suit it well. The plants distributed probably come under the very weak subspecies *pratense* (Sprengel).—J. E. LOUSLEY.

Linnaea borealis L. Pine woodlands and heaths formed therefrom, near Banff, Scotland, July 1931.—K. W. BRAID.

Galium Mollugo L., var. *angustifolium* Leers. Walton Downs, Surrey, August 22, 1926. (Ref. No. 2942). A reduced form of the sub-var. *subpubescens* H. Br., probably due to the exposed chalky habitat. *G. Mollugo* L. is very much influenced by habitat as may be seen when growing on shingle beaches or sandy shores.—C. E. BRITTON.

Galium Mollugo L., var. *pycnotrichum* H. Br. Ashtead and Headley, Surrey. Various dates. (Ref. Nos. various). From several Surrey localities. An account of this var. appears in *Journ. Bot.*, 1934, p. 246, where it is identified with *G. scabrum* of Withering's *Arr. Brit. Pls.*, ed. 3, 2, p. 190.—C. E. BRITTON.

Galium Vaillantii DC. In the allotment fields at Littlebury, near Saffron Walden, N. Essex, July 8, 1934. (Ref. No. F.29). These specimens are from one of Gibson's original and best known stations, where he discovered it about 90 years ago. In spite of the efforts of several generations of allotment holders to eradicate the plant, it is probably quite as plentiful as formerly. The plant was gathered in the company of Mr A. L. Still, and we both at once noticed that it seemed very different from the *Vaillantii* of the Somerset peat moors which we have both seen in the field in recent years. In view of the fact that the Somerset plant has been distributed several times recently, the present specimens may be useful for comparison. The Somerset plant is much larger in all its parts, the fruits are larger and far less numerous, and the general appearance in the field is very different. Other observers have evidently not been satisfied that it is the same as the French plant (*Rep. B.E.C.*, 1913, 471/2; *Rep. Watson Club*, 1915/16, 541). It cannot be very different from *G. Aparine*, var. *pseudo-Vaillantii* Ar. Bennett, of which the description runs: " A *G. Aparine* cymis ramosis, floribus viridioribus et magis numerosis, fructibus minoribus differt " (Salmon, C. E., *Fl. Surrey*, p. 363 (1931)). Salmon points out that *G. Vaillantii* has still smaller fruits, and more branched cymes—which is just the difference between the Somerset and Essex plants. I do not think this variation in the Somerset plant is entirely accounted for by the peaty earth in which it grows.—J. E. Lousley. " I have only seen one gathering of the Shapwick plant (coll. C. & N. Sandwith, September 1919, in Herb. Kew.); the fruits in that are distinctly smaller than those of Mr Lousley's specimens. Examination of a long series of specimens collected by Gibson and others in Essex, and comparison of these with the above Shapwick specimen, shows that there is no essential difference between the Somerset and Essex plants. The species evidently varies considerably from year to year, at least in its Essex localities. Mr Lousley's 1934 gatherings are, as he notes, remarkably fructiferous, a condition almost certainly attributable to the exceptionally dry summer."—H. K. Airy-Shaw.

Guizotia abyssinica Cass. Waste ground, Dagenham, Essex, September 29, 1934.—R. Melville. " Should be written *Guizotia abyssinica* (L. f.) Cass."—Ed.

Cnicus pratensis Willd. Stanton, N. Staffs, June 23, 1934.—E. S. Edees. " The best name under International Rules seems to be *Cirsium anglicum* (Lam.) DC., if Druce was right in rejecting F. N. Williams' application of *C. britannicum* Scop."—Ed.

Hieracium serratifrons Almq., near var. *lepistoides* Johans. Det. H. W. Pugsley. Railway bank S. of Winchester, S. Hants, v.-c. 11, June 12, 1934. (Ref. No. 1087).—P. M. Hall.

Hieracium subravusculum (W. R. Linton). Limestone quarry, Micklefield, West Yorks, v.-c. 64, June 24, 1933. (Ref. No. 11).—W. A. Sledge. " In W. R. Linton's *British Hieracia subravusculum* was described as a variety of *H. vulgatum* Fr. Mr Sledge's plants clearly belong to *H. vulgatum* as understood by British botanists, but hardly seem referable to var. *subravusculum*, as this should have eglandular phyllaries. A single specimen on one sheet differs from the rest and has the phyllaries wholly glandular. This appears to be a small example of *H. diaphanum* Fr."—Pugsley.

Hieracium sp. Abbotsford, Roxburgh, July 30, 1934.—R. J. Burdon. " This seems to belong to the aggregate *H. serratifrons* Almq., but is not identical with the forms occurring in the south of England. The specimens are not very satisfactory."—PUGSLEY.

Gaultheria Shallon Pursh. Naturalised on the slopes of Leith Hill, Surrey, September 2, 1934. (Ref. F.24). Recorded from here in *Journ. Bot.*, 1914, 250, and 1915, 279, and repeated in *Rep. B.E.C.*, 1933, 533, and duly noted in Salmon's *Fl. Surrey*, p. 441, this plant appears very much at home on the steep slope of Leith Hill, where it is probably still spreading. It obviously originated in the garden of the house immediately below, in which it is still growing. The plant has been noticed as naturalised in the New Forest (*Journ. Bot.*, 1908, 198, and *Rep. B.E.C.*, 1928, 746), in Forfarshire (*Rep. B.E.C.*, 1915, 273), West Ross (*op. cit.*, 1926, 123), and Derbyshire (*op. cit.*, 1928, 746), but so far I have not traced any record that it is established in any continental country. *Gaultheria Shallon* is a native of North America, where it is known as " Sallal " or " Shallon," and is occasionally seen in cultivation in this country. Unfortunately many of the specimens distributed were over flower, but they show the berry-like capsules with fleshy non-adherent edible calyx with scarlet bracts, which are a feature of the plant.—J. E. LOUSLEY. " Hegi, *Ill. Pl. Mitt.-Eur.*, vii, 196 (1931), records both this species and *G. procumbens* L. as long established near Bremen, North Germany. It is not strictly accurate to speak of the ' berry-like capsules ' ; the berry-like fruit is composed of a normal, dry, loculicidal capsule surrounded by the eventually blue, fleshy, accrescent calyx."—H. K. AIRY-SHAW.

Pyrola rotundifolia L. Newham, Cheviotland, v.-c. 68, June 27, 1934. (Ref. No. 1136).—P. M. HALL and W. A. SLEDGE.

Limonium vulgare Mill. By the estuary of the Rivers Stour and Avon, Mudeford, Christchurch, S. Hants, v.-c. 11.—J. FRASER. " *Limonium* for the Sea-lavenders has been unanimously rejected in favour of *Statice* L. em. Willd. by the International Committee which recently considered the claims of numerous proposed additions to the list of *genera conservanda*. Our common Sea-lavender must therefore be known once more as *Statice Limonium* L."—ED.

Fraxinus Oregona Nutt. Near Tenterden, E. Kent, v.-c. 15, July 19, 1934.—W. H. PEARSALL. " Doubtless a planted tree. It is the common Ash of North-west America, and is occasionally met with here as a cultivated tree. It was introduced more than half a century ago."—A. B. JACKSON.

Phacelia tanacetifolia Benth. Waste ground by maltings, Hythe Quay, Colchester, v.-c. 19, May 24, 1934. (Ref. No. 2499). In great quantity, less hispid than Dr Druce's specimen from Horsepath, Oxon, June 1922, but otherwise apparently identical.—G. C. BROWN. " Not *P. tanacetifolia*, but *P. ciliata* Benth. as understood by American botanists."—ED.

Benthamia Menziesii Lehm. Waste ground by maltings, Hythe Quay, Colchester, N. Essex, v.-c. 19, May 24, 1934. (Ref. No. 2498). Apex of nut acute, corrugated, corolla very prominent.—G. C. Brown. "Dr I. M. Johnston, the American specialist in Boraginaceae, referred all our Bristol material of this genus, including specimens very similar to these, to *Amsinckia intermedia* Fisch. et Mey. The name *Benthamia* cannot be used for this genus under International Rules since it is a later homonym of *Benthamia* Rich."—Ed.

Myosotis alpestris Schmidt. Dry Yoredale limestone turf at 2350 feet, Little Fell, above Hilton, Westmorland, v.-c. 69, June 5, 1933. Some members may be glad to have specimens from this very remote locality (first discovered there, I believe, by James Backhouse in 1852). The plant is very plentiful over about half a mile of ground on the S. side of the fell at 2300-2400 feet, both within the drainage area of the Teesdale Lune, and that of the Eden.—A. Wilson.

Myosotis sylvatica Hoffm. Manifold Valley, N. Staffs, May 31, 1934. —E. S. Edees. "Correct. The length of the inflorescence in relation to the height of the plant is rather shorter than in the commonly cultivated form of *sylvatica*."—Wade.

Myosotis sylvatica Hoffm. Left bank of R. Chew, below Chew Magna, N. Somerset, May 1934, see *Journ. Bot.*, 1934, p. 320.—H. S. Thompson. "Correct. A robust form, probably due to habitat and suggesting *M. dissitiflora* in the size of the leaves."—Wade.

Cuscuta Trifolii Babington in Annals & Mag. Nat. Hist., xvi, pp. 1-3 (1845), in three forms (see below). Pilgrim's Way, east of Wrotham, West Kent, August 15, 1934. (Ref. F.15). This Dodder grew in masses on native vegetation for about 40 yards by a chalky track, where it was discovered by A. H. Carter in 1933 when he noted it on at least ten different host plants of very various affinities. It occurs in three forms as now distributed:—(a) With large heads of waxy white flowers—perhaps chiefly on Labiatae; (b) an intermediate form, and (c) with much smaller flowers, distinctly coloured with red (especially on the calyces)—predominantly on *Lotus*. These three forms well agree in having the scales well down in the corolla tube with a rounded sinus between them, and with having usually much closer spirals than in *Epithymum*. They are not definitely linked to their respective host plants, neither is (c) a young state of (a) since the flowers are fully open. No one could reasonably doubt that they represent different growth forms of the same species. The question arises "What is *C. Trifolii* Bab.?" Babington himself appears to have changed his idea of his plant in the course of time. He had been engaged in a very thorough investigation of the corona (scales inside the corolla tube) of *Cuscuta* which led him to the published opinion that these represented aborted stamens, when, in 1843, C. G. Gibson sent him a Dodder which had been found rampant in the clover fields of Essex and other counties. In the *Phytologist*, i, p. 467 (1843), Gibson published some correspondence from Babington on this plant, in which "*Trifolii*" was mentioned as a "provisional" name. This is the reference for the species given in *Index Kewensis* and elsewhere, but it is clear that at that time Babington did not fully understand his own species. In the *Annals and Magazine of Natural History*, xiii, p. 252 (1844), Babington gave a better description and an illustration clearly showing the saccate interstices between the corona segments. In the same periodical, vol. xvi, pp. 1-3, t. 1 (1845), he states that there were errors in his previous paper, and he describes his plant afresh. In the writer's opinion it is upon this last reference that we should rely. It is also apparent, in view of the work in which he had been previously engaged, that Babington's attention at this time was rather focussed on the corona character. Regarding this as the essential character in a variable plant we find it well illustrated by Babington (*l.c.*), Sowerby (*E.B.S.*, t. 2898), and Hegi (vi/3, p. 2097, fig. 3066), but the plant drawn in Butcher & Strudwick (fig. 264) does not agree. The present specimens all exhibited the rounded sinus between the scales in the corolla tube, together with the funnel shaped calyx as described by Babington. It may be added that the doubts expressed by Crépin (*Notes*, Fasc. 4, pp. 28-32 (1864)) as to the existence of a rounded sinus are probably explained by the Belgian plants which he had examined not being identical with the British. Babington stated that the flowers of *Trifolii* were "rather larger than those of *Epithymum*," and his description "Flowers small white" in various editions of the "Manual" must be read as contrasting with *C. europaea*. Probably the plant Babington had in mind was near to my form (b). My form (c) may be the var. *Muelleri* Rouy (*Fl. France*, x, p. 358 (1910)).—J. E. LOUSLEY. "This is a very interesting series and one would like a series of coloured plates of the "forms" made from living material. The population described might well repay more detailed analysis than is indicated in Mr Lousley's useful note. Are the three "forms" always clearly differentiated? Do they "come true" from seed? If so, what are their genetic relationships? The overcoming of obvious technical difficulties in cultivating such parasites would no doubt in itself throw light on some aspects of the still obscure subject of parasitism."—TURRILL.

Linaria spuria (L.) Mill. Cultivated field near The Rest, Porthcawl, v.-c. 41, Glamorgan.—Coll. Miss E. M. THOMAS; comm. DEPT. OF BOTANY, NATIONAL MUSEUM OF WALES.

Scrophularia alata Gilib. Near Scoulton, West Norfolk, October 11, 1934. (Ref. F.32). Goddijn & Goethart consider that the British plant is more correctly named as *S. Neesii* Wirtgen. (*Rep. B.E.C.*, 1931, 568/9). Further notes on this species will be found in *Trans. Bot. Soc. Edin.*, i, p. 57 (1843); *Journ. Bot.*, 1877, 306; *Irish Naturalist*, 1896, 182; and *Rep. B.E.C.*, 1915, 359.—J. E. LOUSLEY.

Limosella aquatica L. Breamore, S. Hants, v.-c. 11, August 26, 1934. (Ref. No. 1251).—P. M. Hall. "British botanists will be gratified to learn that their var. *tenuifolia* has at last been recognised as an independent species, see a very important paper by Prof. H. Glück in Engler, *Bot. Jahrb.*, 66, Heft 5 (1934). The correct name for the plant as a species is apparently *L. subulata* Ives."—Ed.

Veronica praecox All. Plentiful in three fields south of Barton Mills, West Suffolk, May 6, 1934. (Ref. F.17). See *Journ. Bot.*, 1933, 159/160; *Rep. B.E.C.*, 1933, 478. This plant extends over a considerably larger area than was at first thought, and whereas last year it was only noticed in fallows it has now been seen in several different crops. The Spring of 1934 being exceptionally late it was not to be found in flower in March, though the plants had almost attained the normal size of maturity. Five weeks later, when the present gathering was made, care had to be exercised not to gather specimens too far in fruit to press well!—J. E. Lousley.

Euphrasia confusa Pugsley, f. *grandiflora* Pugsley. North-east side of Ward Hill, Hoy, Orkney, Scotland, August 20, 1934. (Ref. No. 4989).—Henry Halcro Johnston. "*Euphrasia confusa* Pugsley, f. *grandiflora* Pugsley, with unusually fine-pointed leaf-segments and remarkably fine flowers. I think this year's gathering is identical with last year's."—Pugsley.

Euphrasia occidentalis Wettst. Lundy Island, N. Devon, July 1934. Leg. Dr F. R. E. Wright; comm. W. H. Pearsall. "Yes, rather dwarf *E. occidentalis* Wettst."—Pugsley.

Euphrasia anglica Pugsley. Rough hillside near Polperro, East Cornwall, July 21, 1934.—F. Rilstone. "Yes, rather small specimens with small flowers, but otherwise quite characteristic."—Pugsley.

Euphrasia sp. Moor near Rothbury, Northumberland, July 31, 1934.—R. J. Burdon. "Is *E. confusa* Pugsl. (f. *albida*); not good specimens. A vice-county record for Cheviotland (v.-c. 68)."—Pugsley.

Euphrasia sp. Whim Lamancha, Peebles-shire, July 13, 1934.—R. J. Burdon. "Is *E. nemorosa* Löhr, var. *collina* Pugsl., gathered young, a v.-c. record for Peebles (v.-c. 78)."—Pugsley.

Euphrasia sp. Sharkham Point, S. Devon, July 4, 1934.—H. Foster. "Stunted *E. nemorosa* Löhr; poor material. Is this not Sharpham Point?"—Pugsley.

Melampyrum arvense L. In wheat, on clay subsoil, Newton Blossomville, Bucks, v.-c. 24, July 4, 1934.—Coll. A. W. Previte; comm. J. E. Little. "Mr Little wrote that he sent a note on *M. arvense* to the autumn issue of *Countryside*, 1934. The plant is abundant in some parishes in Essex, where it is known as 'Hogmeteg.' "—ED.

Melampyrum pratense L., var. *ericetorum* D. Oliv. Abinger Common, Surrey, June 13, 1934. (Ref. No. 4125). For the knowledge of this locality I am indebted to my friend Mr A. Beadell, who brought to me from "Leith Hill" fresh examples of a Cow-wheat with purple flowers. On visiting the locality the variety was seen growing abundantly on roadside banks associated with *Vaccinium Myrtillus*, and was very noticeable owing to the prevailing purple hue of the flowers. At first the flowers are yellow, but, presumably as an after-effect of pollination, become ultimately a deep rose-purple hue. Var. *ericetorum* D. Oliver is represented in herbaria from several localities in the Leith Hill and Hurt Wood districts of Surrey, and was gathered by myself several years ago near Friday Street in the same area. All Surrey examples of this variety are of comparatively small dimensions, even at maturity. —C. E. BRITTON.

Melampyrum pratense L., var. *commutatum* Schoenh. Felbridge, Surrey, July 3, 1934. (Ref. No. 4140).—Coll. A. BEADELL; comm. C. E. BRITTON. Also from Ottershaw, Surrey, July 5, 1931. (Ref. No. 3808).—C. E. BRITTON. "*Melampyrum pratense* L., var. *commutatum* (Tausch) Beck. The authority for the varietal name is, following Beauverd, that now given, not "Schoenh.," as inadvertently given on the labels. The gatherings from Ottershaw (3808) and Felbridge (4140) obviously belong to an identical form, for which I can find no better name than the one applied. Var. *commutatum* was distinguished by Beauverd from its nearest ally, var. *vulgatum* "(Pers.) Beck" chiefly by reason of the more numerous intercalary leaves (2-5 pairs in var. *commutatum* against 0-2 pairs in var. *vulgatum*). The specimens distributed from both localities possess two or three pairs of intercalary leaves, and some plants bore four pairs. It may here be allowable to mention that the character of the number of pairs of intercalary leaves present in any variety is a remarkably constant feature, but can only be appreciated by examination of numerous individual plants of a gathering. Typically var. *commutatum* should possess rather broader leaves, both cauline and intercalary, than those of the plants distributed. I have seen other plants from England which are more satisfactory in that respect.—C. E. BRITTON.

Melampyrum pratense L., var. *lanceolatum* Spenn. Chelsham, Surrey, June 15, 1934 (Ref. No. 4127A). *Ibid.*, July 10, 1934 (Ref. No. 4127B). Near Broxbourne, Herts, June 28, 1930 (Ref. No. 3641). Horsey Common, W. Kent, July 5, 1934 (Ref. No. 4144). This variety is the common form of the species and occurs chiefly on argillaceous and siliceous soils. Attention is directed to the earlier and later gatherings from Chelsham, Surrey, showing differences in habit due to the age of the plants. The later gathering emphasises the need of securing fully developed plants with both flowers and fruit. It is also essential for identification that complete specimens should be gathered. Too often *M. pratense* is seen in herbaria represented by the upper part of the plant only.—C. E. BRITTON.

Mentha rotundifolia Huds. Wet ditch by a hotel, Woolacombe, North Devon, August 12, 1934.—R. KNOWLING. "All the specimens correct, but some of them from the wetter part of the ditch had abnormally large leaves, deep teeth and very thin tomentum. Others were normal in these respects."—FRASER.

×*Mentha cordifolia* (Opiz) Fraser (*M. rotundifolia* × *spicata*). Grafham, near Bramley, Surrey, v.-c. 17, September 4, 1934.—Coll. A. L. STILL; comm. E. C. WALLACE. "Notice the exserted stamens. Can this be a sport from, say, *M. alopecuroides*, of which there was a vigorous plant in the midst of the plant contributed? The habit of the inflorescence in this plant and in *M. alopecuroides* is identical."—WALLACE. "The terminal spike is 4-6.5 cm. long and the flowers are purple. After the flowers drop, the spike will look very slender, especially when the whorls become separated. I would place this under *M cordifolia* (Opiz) Fraser, var. *dourensis* Fraser. This makes my fourth British record of the variety."—FRASER. "The very deep colour of the flowers is surely unusual for ×*Mentha cordifolia* Opiz. In view of this, and the deep serrations of the leaves, might this not be *Mentha spicata* Huds. × *M. alopecuroides* Hull?"—KNOWLING.

×*Mentha cordifolia* (Opiz) Fraser. Cult. Sutton, from Exmoor, S. Somerset, v.-c. 5, August 1934.—E. C. WALLACE. "I agree it is this hybrid, but it differs from the original in having oblong to narrowly oval leaves, instead of leaves of more ovate outline. All the other technical characters are present. The hybrid varies a little in Britain. I have one from near Norwich, with bright rose flowers, and the var. *dourensis* from N. Aberdeen, which has a slender terminal spike, up to 9 cm. long, the only one I considered worth a varietal name."—FRASER.

×*Mentha cordifolia* (Opiz) Fraser, var. *brevifolia* Fraser. Cult. Kew, from Abrook Common, Surrey, v.-c. 17, July 27, 1934. (*M. rotundifolia* × *spicata*). Both the hybrid and the variety were known to Sir J. E. Smith, who described them as varieties of *M. viridis*, without names.—J. FRASER.

×*Mentha cordifolia* (Opiz) Fraser, var. *dourensis* Fraser. Cult. Kew, from The Dour, New Aberdour, N. Aberdeen, v.-c. 93. The chief distinctions of the variety are the longer and more slender spikes, taking more after that of *M. spicata*, but with darker flowers than *M. rotundifolia*, and the leaves are more acute than those of ×*M. cordifolia*. In seasons of more rain, the spikes can be longer and the leaves broader. —J. FRASER. "This plant is exactly like plants previously distributed under the name 'var. *dourensis* Fraser'."—WALLACE.

×*Mentha mollis* Fraser (*M. rotundifolia* × *spicata*). A sport from ×*M. cordifolia* (Opiz) Frazer. Cult. Kew, Surrey, August 12, 1933, and August 11, 1934. I have noticed this sport in an isolated bed of ×*M. cordifolia* for many years but separated it from the rest in 1933. The leaves can be broader, resembling *M. rotundifolia*, but it has had two very droughty seasons in our sandy soil. In 1929 I sent specimens of another sport from the same parent to the Watson Exchange Club. This had linear-lanceolate leaves, making an approach to *M. spicata*, but more hairy.—J. FRASER.

Mentha longifolia (L.) Huds., var. *pulverulenta* (Strail). By River Darenth, Farningham, West Kent, September 23, 1934. (Ref. F.27). Although past their best these specimens may be useful to members as illustrating the persistence of a very rare mint. Specimens from this station were collected by James Groves in 1881 (*Rep. B.E.C.*, 1886, p. 156) and by Marshall in 1893 (*Rep. B.E.C.*, 1894, 458). Guided by these records, Mr A. L. Still rediscovered the plant this year after a special search, and directed me to the spot. The only other British station known to me is Tadworth, Surrey, whence I distributed specimens through both clubs in 1928, and where it still exists.—J. E. LOUSLEY. " All the gathering is uniform and correct. The leaves are very much smaller than usual, occasionally short and broad. The mealy character is present as usual on the upper surface chiefly, but the base of the hairs that give this appearance are brown or black. These changes show how drought can affect Mints."—FRASER.

Mentha spicata Huds. Swampy part of Coldharbour Common, near village, Surrey, v.-c. 17, August 6, 1934. Plants 1-2 m. high, with long-toothed narrow leaves, glabrous.—E. C. WALLACE. " Very fine specimens indeed. It is many years since I have seen *M. spicata* so free from rust (*Puccinia menthae*) which is the bane of this species, mostly everywhere at present, wild or cultivated. The height of the stems, and the narrowness of the leaves are also notable, and I hope Mr Wallace will give an opinion as to any local causes that may have conduced to these excellent results."—FRASER.

Mentha piperita L. Holmwood Common, amongst nettles and gorse, Surrey, v.-c. 17, September 1, 1934. This is not the usual plant with tapering cuneate leaf bases, nor is it quite the var. *subcordata* Fraser. A greater supply of moisture at the roots would probably, however, cause this plant to be well marked *subcordata*.—E. C. WALLACE. " Beautiful, very tall and very floriferous specimens. The very short spikes, short, broad leaves, rounded at the base, and suddenly narrowed to the apex make this *M. piperita* L., var. *subcordata* Fraser. Only the upper leaves are inclined to be subcordate, but they are easily obtained in a garden or small stream. The typical *M. piperita* has longer spikes, longer leaves more gradually acuminate and decidedly cuneate at the base."—FRASER. " Is this the type? The small heads and small upper leaves with their rounded and subcordate bases seem to bring the plant near to Sole's var. *vulgaris* and Briquet's var. *Druceana*. The serratures are too many and too deep for the latter, and as the lower leaves are decidedly cuneate at the base I suggest var. *vulgaris*."—Knowling.

Mentha aquatica L., forma. Brook, Pebmarsh, N. Essex, v.-c. 19, September 6, 1934. (Ref. No. 2506). Plant soon reddening, and flowers deep in colour; it has signs of *verticillata* influence.—G. C. Brown. "Not the typical *M. aquatica*, but *M. aquatica* L., var. *major* Sole, which has longer, more acuminate leaves, and more or less narrowed or cuneate at the base. It might be a cross between the two, but I consider all the modifications due to excess of moisture. In semi-liquid mud the leaves may turn red, brown or violet."—Fraser.

×*Mentha hircina* (Hull) Fraser. Hort. Streatham; root from R. F. Towndrow. August 19, 1934. (Ref. No. F.33). Of this plant Mr Towndrow writes: "It was found for the first time in Worcestershire on the Leigh Brook, Alfrick, and I have not seen it elsewhere, though it occurs for some distance along that brook. It was found by the late A. R. Waller and myself in 1884, and is included in the *Bot. Record Club Rep.* of 1887. The *Botany of Worcester* makes it a hybrid of *aquatica* and *longifolia*." To judge from other specimens and descriptions the plant has become less hairy, and the leaves broader and less coarse in cultivation.—J. E. Lousley. "Rather this is ×*M. palustris* (Sole) Fraser. The chief difference between it and Sole's Plate 6 is that the terminal spike of the latter is narrowed to an obtuse point, whereas J. E. Lousley's specimens are distinctly capitate with a broad head, showing the influence of the *M. aquatica* parent very clearly. There has been no distribution of the typical ×*M. hircina* for many years past—only the tomentose variety of it."—Fraser. "In my opinion this is ×*Mentha palustris* (Sole), which has the same parentage as ×*Mentha hircina* (Hull), but differs in having the leaves much nearer in shape to the *aquatica* parent, whereas in ×*Mentha hircina* (Hull) they are nearer the *longifolia* parent."—Knowling.

×*Mentha verticillata* (L.). Penhallow, Perranzabuloe, West Cornwall, September 8, 1934.—F. Rilstone. "Not the type of Linnaeus, but ×*M. verticallata* (L.), var. *ovalifolia* (Opiz) H. Braun. Leaves oval, with a very convex margin. The leaves are more hairy than usual for a plant most frequent by pools, ponds and river banks."—Fraser. "Yes, and I presume one of the many forms of var. *rivalis* Briquet, as the leaves are more or less attenuate at the base."—Knowling. "Is covered by the name var. *paludosa* Sole."—Wallace.

×*Mentha verticillata* (L.), var. *paludosa* (Sole). Wet meadow, Braunton Burrows, North Devon, August 14, 1934. This answers to ×*M. verticillata*, var. *paludosa* Sole, but is not the variety really simply a form? The characters seem to be inconstant enough, and the subspicate inflorescence—which appears to be the best character—is often verticillate.—R. KNOWLING. "All the specimens are the var. *paludosa* (Sole), but one sheet was made up of six miniature specimens with small leaves and a crowded inflorescence. They should have been distributed singly on other sheets. If they had been less densely hairy they could have been passed as the var. *adulterina* Briq., and could not have given a beginner a good idea of var. *paludosa* (Sole)."—FRASER. "Rather immature, but even so scarcely var. *paludosa* Sole."—WALLACE.

Mentha aquatica × *arvensis* (*sativa* L.). Sharpham Peatmoor, N. Somerset, August 25, 1934. In considerable variety there.—H. S. THOMPSON. "One of the pieces has rather broad leaves, and two other pieces have small leaves and much larger bracts (floral leaves). I have seen *M. arvensis* doing this in the garden, and wild state, when June was dry, and July or August wet. All the others in the gathering have small leaves similar to those of *M. arvensis*, but with the calyx teeth of the hybrid. I name it ×*M. aquatica* × *arvensis*, var. *Lintoni* or, as Briquet had it, ×*M. verticillata* (L.), var. *Lintoni* Briq. Some of the pieces are very much branched but there is nothing out of the way in that. In *Menthae Britannicae* I described the stem as apparently simple, because that was due to the single stem given me to describe." —FRASER. "Two different plants on my sheet."—WALLACE.

×*Mentha gentilis* L. Ditches about Llangennith, Gower, Glamorgan, v.-c. 41, August 1934.—Coll. A. L. STILL; comm. E. C. WALLACE. "This plant closely resembles a sheet in Herb. Brit. Mus. from E. F. Linton's collection, labelled *M. gentilis*, var. *Pauliana* F. Schultz, 'near Penard Castle, Gower.' It bears a note 'agreed to by Malinvaud.' I could not find any *M. gentilis* in that locality, and Linton's sheet is of a late gathering and not a very good specimen, but I think this Llangennith plant is the same thing. Whether it is var. *Pauliana* is another question. This is not a very well-defined variety."—A. L. STILL. "The hairs on the calyx teeth are better developed, the stems are stronger, more branched, with shorter internodes, and the leaves are larger than those of the Leith Hill specimens. The stems and leaves are mostly distinctly less hairy. All these characters I attribute to the moister, more equable, climate of Wales, except the branching stems, which is the usual character of ×*M. gentilis*, where not too crowded in itself or with other vegetation. Smith called it the Bushy Red Mint." —FRASER. "The hairs on the calyx teeth are very long and numerous, so that this might well be Schultz's variety *Pauliana*."—KNOWLING.

×*Mentha gentilis* L. Swamp by stream, Broadmoor, Leith Hill, Surrey, v.-c. 17, August 6, 1934. Discovered here in 1933 by A. L. Still.—E. C. WALLACE. "All the gathering uniformly ×*M. gentilis*. The hairs on the calyx teeth are short, sometimes few, but much better on the unopened buds. Other features are small leaves, long, slender, and little or not branched stems, a good example of how drought and environment can modify Mints."—Fraser.

Mentha arvensis L. Hedgerow, Woolacombe, N. Devon, August 13, 1934. The specimens are very starved, due to shallowness of soil and over-abundance of stones. Leaves broadest at the base, and pedicels hairy. This would appear to bring the plant under ×*Mentha verticillata*, but the calyx teeth are too short. The capitate inflorescence on some of the specimens is unusual for *M. arvensis* L.—R. Knowling. "Correctly named. A dry situation and a droughty season account for the dwarf habit, contracted inflorescence, and both sides of the leaves being densely hairy. These variations are not uncommon. I also have a variety of ×*verticillata* (L.), with the stem ending in a capitulum."—Fraser. "Mr Knowling labelled his specimens *M. arvensis*, var. *densifoliata* Briq., but Mr Fraser omitted the varietal name in returning his criticism, so that his 'correctly named' may merely refer to *M. arvensis*."—Ed.

Mentha arvensis L. Wet meadow, Dunmaglass, Struy, Inverness-shire. August 18, 1934.—R. Knowling. "All are *M. arvensis* with elliptic leaves more or less hairy on both sides. The type of Linnaeus has glabrous pedicels and few are of this character; but most of them have more or less hairy pedicels and would come under f. *hirtipes* Fraser, though this character is not of great importance."—Fraser.

Lamium hybridum Vill. Northern Bye-Pass, Oxford, May 30, 1934. —J. Chapple.

Lamium hybridum Vill. Waste ground, Brislington, N. Somerset, v.-c. 6, May 2, 1934. The shape of the leaves and the length of the corolla tube suggest *Lamium purpureum*, var. *decipiens* Sond., but as there is no ring of hairs in the tube it is probably *L. hybridum* Vill.— Ida M. Roper. "The leaf shape in my specimen is that of *L. hybridum*, not that of *L. purpureum*, var. *decipiens* Sond. The length of the corolla tube depends on whether the flowers are cleistogamous or entomophilous (see *Rep. B.E.C.*, 1912, 277)."—Wilmott.

Herniaria hirsuta L. A garden weed since introduction in 1923, Newport, Isle of Wight, September 1932.—J. W. Long.

Chenopodium rubrum L. Moist hollow among sand dunes, Perranporth, West Cornwall, October 1, 1934. All the plants collected were prostrate and comparatively small but there were many equally small erect plants and a few enormous prostrate ones. The erect plants had apparently flowered earlier; they were too far gone for collecting.—F. Rilstone. "This comes under the variety or form *pseudo-botryoides* Syme, but these plants are not identical with some sent in 1932 from Byfield, Northants."—Wallace.

Chenopodium Botryodes Sm. Northney, Hayling Island, v.-c. 11, September 7, 1934. (Ref. No. 15).—Leg. P. M. HALL and W. A. SLEDGE. Comm. W. A. SLEDGE. "*C. intermedium* Mertens et Koch."—WATSON. "*C. intermedium* Mert. et Koch is treated by authors as a variety or form of *C. urbicum*. Mr Watson would not presumably put any such interpretation on Dr Sledge's plant."—ED.

Chenopodium urbicum L. or var. *intermedium* (M. et K.) Moq. Border of waste ground by bank of R. Avon, Feeder Road, Bristol, August 11 and September 3, 1934. By September 3 the top of this much-branched plant had been cut or knocked off.—H. S. THOMPSON. "*C. rubrum* L."—ED.

Salicornia ramosissima Woods. Ditch by R. Colne, Alresford, N. Essex, v.-c. 19, September 16, 1934. (Ref. No. 2507).—G. C. BROWN. "Correctly placed under this aggregate name, but these forms need further subdivision."—WILMOTT.

Salicornia appressa Dum. Muddy depression in salt marsh, N. Hayling, S. Hants, September 30, 1933. (Ref. No. 994).—P. M. HALL. "Although I named this for Mr Hall last year, I think it is best put under *S. Smithiana* Moss, having since seen it *in situ*."—WILMOTT.

Salicornia disarticulata Moss. N. Hayling, S. Hants, September 30, 1933. (Ref. No. 993).—P. M. HALL. "Correct."—WILMOTT.

Salicornia spp., general note. "Without notes on many points which are lost in drying, it is impossible at present to make satisfactory determinations from dried material alone. I should be glad if contributors who propose sending material of this genus for distribution would send me some of the material fresh."—A. J. WILMOTT.

Polygonum maculatum Trim. et Dyer? Small, hoary, nearly prostrate form; ?due to position on sun-scorched, sandy waste. Sandown, Isle of Wight, June 30, 1934.—JAS. W. LONG. "Gathered too early in the season, as most of the plants are only at the beginning of the flowering period. Ripe fruit is essential in the determination of Polygona, and very few mature nutlets can be found in the entire gathering, but those present are characteristic of *P. lapathifolium* L., not of *P. nodosum* (*P. maculatum* of English collectors). It will be recognised that these plants do not represent the ordinary field form of *P. lapathifolium*, but belong to the var. *tomentosum* (Schrank) Beck, as a small prostrate form."—BRITTON.

Polygonum nodosum Pers., var. *incrassatum* Rouy, f. *stenophyllum* C. E. Britton. Staffhurst Wood, Surrey, August 14, 1934. (Ref. No. 4161).—C. E. BRITTON; coll. A. BEADELL.

Polygonum nodosum Pers., var. *erectum* Rouy × *P. Persicaria* L.? Roadside weed, Buckingham Place, Clifton, v.-c. 34, September 7, 1934.

See C. E. Britton's note (on plants from same ground) in *B.E.C. Rep.*, 1933, 230.—H. S. THOMPSON. "Has the habit of *P. Persicaria* L., var. *ruderale* Meisn., but I do not think it is that, although it may be an impure strain of the species in question, arising from a former crossing with an allied species marked by the glandular development of the peduncles and perianths, e.g., *P. lapathifolium* or *P. nodosum*. The feature that first attracts attention is the presence of scattered sessile or pedicelled glands on the peduncles and the abundant mostly small glands on the perianths. The ochreæ display mixed characters as they are lax (as in *P. lapathifolium*) but strongly fringed (as in *P. Persicaria*). The marginal bristles moreover are not uniform in length (as in *P. Persicaria*) but include many of lesser size, and smaller marginal bristles are characters of *P. lapathifolium* and *P. nodosum*. The mature nutlets also exhibit mixed characters and there is a good deal of minor variability among them. The following forms may be recognised: (1) Broadly ovate in outline, tri-lobed, lobes compressed; (2) compressed, broadly ovate, concavo-convex; (3) compressed, orbicular-ovate, one surface convex and gibbous, the other concave; (4) compressed, orbicular-ovate, one surface convex, more prominently gibbous than the preceding, the second surface depressed, with a central broad keel about ⅓ the length of fruit; (5) compressed, orbicular-ovate, convex and gibbous on one surface, plane on the other; (6) compressed, orbicular-ovate, bi-convex, both surfaces with an obscure central ridge. In the case of *P. nodosum* and *P. lapathifolium* the compressed nutlets are orbicular or orbicular-oval bi-concave, with or without indications of a central ridge; rarely the nutlets are tri-lobed. In *P. Persicaria* the nutlets are tri-lobed or plano-convex, the plane surface occasionally showing traces of a central ridge. It will be seen from the details given of the Clifton plant that the fruits differ from those of *P. Persicaria* and *P. nodosum* and exhibit characters of each. Whilst the plants certainly appear close to *P. Persicaria* in major characters, they also appear, in my opinion, to possess features derived from a second species, viz., *P. nodosum* (the small glands indicate this rather than *P. lapathifolium*). I would write the name *P. nodosum* × < *P. Persicaria*."—BRITTON.

Polygonum lapathifolium L., var. *tomentosum* (Schrank) Beck. Cultivated field, Llanrumney, v.-c. 35, Monmouthshire, coll. A. E. WADE, October 3, 1934; comm. DEPT. OF BOTANY, NATIONAL MUSEUM OF WALES. "This would appear to come under the var. *tomentosum* Beck., although not an extreme form of it."—WADE. "Scarcely characteristic of the variety. I like to see the leaves really white-felted before applying the varietal name, not greenish-grey, as most of these are."—BRITTON.

Polygonum Bungeanum Turcz. Cultivated in 1934 in the Groningen Botanic Garden (Holland) from seeds of a specimen collected in 1933 by W. A. Sledge, Olympia Sidings, Selby (*Rep. B.E.C.*, 1933, vol. x, part iii, p. 481).—B. H. DANSER.

Rumex salicifolius Weinm. Near Mitcham, Surrey, August 28, 1934. (Ref. F.22). See *Journ. Bot.*, 1913, 280, and *Rep. B.E.C.*, 1926, 48. Danser has recently made two subspecies under this name (*Nederl. Kruid. Arch. Jaarg*, 414, 1925), but I do not know under which of these the present plant comes. *R. salicifolius* has become a much more frequent alien in recent years, and, although it is probably pure coincidence, it is noticeable that most of the British records are from railway banks or sidings. The present specimens were from a station found by Mr A. H. Carter, where a few plants grew by some houses in course of erection near a railway.—J. E. LOUSLEY.

Salix aurita × *Caprea*. (*S. capreola* Kerner). Merstham chalk-pits, Surrey, April 14, 1929 and July 10, 1932. (Ref. No. 442).—J. FRASER.

Salix aurita × *lapponum*. With both parents beside Allt an Loch, Glen Callater, alt. 620 m., South Aberdeen, v.-c. 92, July 12, 1934. (Ref. No. S.5).—R. MACKECHNIE and E. C. WALLACE. "All uniformly correct for one form of this variable hybrid. *S. aurita* is seen in the obovate, rugose leaves with acute, twisted apex, crenate serratures (if any), undulate margins, glabrous and shining year old wood and buds. To *S. lapponum* belong the mostly entire leaves, grey-green, woolly pilose upper surface, and grey tomentose under surface of the leaves and short shoots."—FRASER.

Salix atrocinerea × *aurita*. (*S. Charrieri* Chass.). Whyteleafe, Caterham Valley, Surrey, v.-c. 17. (Ref. No. 579). Some collected May 1, 1932; August 28, 1932; others March 26, 1933; August 28, 1932, but all from the same bush. The pseudospecific name was given by Chassagne to this hybrid in France, where *S. atrocinerea* is rare.—J. FRASER.

Salix (*arenaria*) × *repens*. (*S. fusca* L.). Littleworth Common, Surrey, v.-c. 17, May 3, August 9, 1931. (Ref. No. 759). It will be noticed that *S. arenaria* is written within brackets; that means that Dr Floderus was a little doubtful if it was one of the parents of this hybrid. The underside of the leaves has, however, the satiny gloss of *S. arenaria*, a little obscured by the darkening of the leaves. The other parent could not have been *S. aurita*, because I have that in its smallest form, and the leaves are shorter and broader than those of this plant.—J. FRASER.

Salix repens L., ♀. Tiptree Heath, N. Essex, v.-c. 19, May 20, 1934. (Ref. No. 2497). Quite prostrate.—G. C. BROWN. "Correct; a small leaved form of the usual run of *S. repens*. Dr Floderus, of Stockholm, claims that *S. repens* should have glabrous ovaries and pedicels, and a long style. I have fifty sheets or more of the group, but only a very few of two varieties have glabrous ovaries. A larger number have glabrous fruits, owing to glabrescence during the growth of the fruit. The pedicels of my varieties with glabrous ovaries have downy pedicels. Dr Floderus classes all those with hairs on any part as *S. arenaria* × *repens*. I retain all names given by Linnaeus, Smith and Wulfen, merely writing the above parentage on the covers. This mixture pervades the whole of Britain. Glabrous pedicels are extremely rare. *S. arenaria* of Dr Floderus is *S. argentea* Sm., a maritime variety."—Fraser.

Empetrum nigrum L. Craig-y-Cilau, near Crickhowell, Breconshire, v.-c. 42, coll. H. A. Hyde, June 20, 1932.—Comm. Dept. of Botany, National Museum of Wales.

Juncus maritimus L. Berrow salt marsh, N. Somerset, October 10, 1934. Only one large clump seen. It had 50 heads, and was associated with *Scirpus maritimus*, *Aster Tripolium*, etc. Very rare in Somerset. —H. S. Thompson.

Juncus bulbosus L., var. *fluitans* (Lam.). Black Pond, Esher Common, Surrey, v.-c. 17, July 26, 1931. I have not been able to supply fruiting pieces in all cases, but have aimed at getting rosettes of the filiform, floating or submerged leaves.—J. Fraser. "Yes, *Juncus supinus* Moench, subsp. *eu-supinus* Asch. & Graeb., var. *fluitans* (Lam.). To be distinguished from the var. *confervaceus* St Lager, which is a form of deeper water with longer, filiform, less divaricate leaves. Plants mentioned in *Rep. B.E.C.*, 137/8, 1885, and 423, 1893, as var. *fluitans* are more probably var. *confervaceus*, but I have not seen specimens. These very interesting water forms are well worth naming as they differ so greatly in appearance from the land forms of *J. supinus* that they prove serious stumbling blocks to beginners unless attention is directed to them."—Lousley.

Juncus compressus Jacq. Pixey's Mead, Oxford, July 3, 1934.—J. Chapple.

Juncus compressus × *Gerardi*. (×*J. transiens* Druce). Pegwell Bay, East Kent, August 11, 1934. (Ref. F.16). This plant occurred under ideal conditions for the name suggested. There was a large patch of *J. compressus* Jacq. with rich dark green leaves, a patch of *J. Gerardi* with lighter green leaves, and between them the "hybrid" of an intermediate shade. Closer inspection showed that the rhizomes of the hybrid were intermingled with those of the two supposed parents at several places, but the general effect as seen from the path was very noticeable. Whether these colour differences in the leaves obtain generally for the parents is doubtful—I have not noticed it elsewhere. The hybrid was perhaps first noticed by Haussknecht (*Mitth. Geogr. Ges. Thür.*, ii, 217 (1884)), and is mentioned in Buchenau's Monograph of the genus, where he says "Probabiliter frequentius formatur." In this country the name has been suggested for several gatherings, but opinion of the Referees has differed. The present plants, although bearing occasional capsules, had a markedly infertile weakly general appearance in the field, even where intermixed with the supposed parents. As the "hybrid" had a strong rhizome, and the gathering was fairly uniform it is possible that it only arose once, and that the whole colony was formed by vegetative reproduction. However, the clay in which they were growing had become extremely hard, and it was impractical to obtain more than a few fragments of the underground parts for distribution. Owing to the great difficulty of finding a sufficient number of reliable characters to distinguish between the putative parents I should not feel justified in describing these plants as the hybrid without expressing some doubt, but of three points I feel quite certain: (1) The plants distributed are not a shade form. On bare mud they were merely dwarfed, while remaining essentially the same. (2) They are not merely an immature form. Some had capsules formed, while the fact that a large patch was in the same conditions is against this view. (3) They differ from the normal form of both *compressus* and *Gerardi*, and at once impressed me as something new. I cannot trace that Druce ever published a description of his *J. transiens*.—J. E. LOUSLEY.

Juncus macer S. F. Gray. Pathside in a pasture near Gwaelod-y-Garth, Taff's Well, Glamorgan, v.-c. 41, coll. A. E. WADE, July 8, 1934. —Comm. DEPT OF BOTANY, NATIONAL MUSEUM OF WALES.

Luzula albida (Hoffm.) Lam. et DC. Garden, Newport, Isle of Wight, August 1933.—J. W. LONG. "Yes, and perhaps the correct name under International Rules, the combination *L. nemorosa* (Poll.) E. Mey. being invalid owing to the previous combination *L. nemorosa* (Host) Baumg. (1816) based on *Juncus nemorosus* Host, non Poll. This is the form with white perianth segments (var. *leucanthema* Wallr. and the later var. *typica* Beck), other Kew sheets from Britain—woods between Tintern and the Wyndcliffe, Monmouth, SANDWITH; Dumfries, ENOCH—being referable rather to the var. *erythranthema* Wallr. = *L. rubella* Hoppe)."—ED.

Potamogeton polygonifolius Pourr., var. *lancifolius* (Ch. & Schl.) Asch. et Gr., f. nov. *attenuatus* Pears. Lundy Island, N. Devon, v.-c. 4, July 1934, leg. Dr F. R. E. WRIGHT.—Comm. W. H. PEARSALL. None of the existing descriptions of the varieties of *P. polygonifolius* is entirely applicable to these plants. They rarely produce floating leaves and these are not the normal coriaceous leaves of this species but merely subcoriaceous, transparent, and having a cancellate venation suggesting that of *P. coloratus*. Moreover, their submerged leaves are normally only half the width (5-6 mm.) of the narrowest similar leaves of the var. *lancifolius* as originally described. (See Plant Notes). I propose therefore to describe them as a new form under that variety. F. nov. *attenuatus* Pears. *Folia omnia lanceolata; natantia pauca* *subcoriacea cancellata, submersa numerosa tenuissima angustissime lanceolata, ca. 5-6 mm. lata, basi apiceque longe attenuata. Fructus non visus. In aqua stagnante. Typus in Herb. Mus. Brit.* So far I have only seen examples of this form from some of the deeper English Lakes —e.g. Wastwater and Ullswater—and from Lundy Island. Normally these plants are sterile, neither flowers nor fruits having been seen. All leaves are of very delicate texture, the floating being few in number—or more often absent—subcoriaceous, transparent, and of cancellate venation. The submersed leaves are unusually narrow, most often 5-6 mm. at their widest part, sometimes less and seldom more. They taper very gradually to each end and are therefore relatively very long, ca. 10-18 cm. Their margins are quite entire and smooth, the midrib broad and prominent with rows of elongate reticulate lacunae on either side. The petioles are long, ca. 5-8 cm., and may be shorter than the laminae (most often), or occasionally as much as twice the length. The var. *lancifolius* frequently occurs in running water and the leaves owe their lanceolate shape to the constant mechanical strain of the current, but the same result is obtained when the leaves are produced in still water under the adverse conditions of low light-intensity due to depth or turbidity—suspended peaty matter or the frequent disturbance of the bottom by diving wildfowl. The f. *attenuatus* has hitherto only been seen from still water in which the latter conditions obtain.—PEARSALL.

Potamogeton lucens L., var. *longifolius* DC. Det. W. H. PEARSALL. R. Avon, Sopley, S. Hants, v.-c. 11, August 26, 1934. (Ref. No. 1067). —P. M. HALL. "This variety is characteristic of our southern chalk streams and other rivers (e.g. R. Wye at Symond's Yat) having a heavy 'pull.' It is *P. lucens* L., var. *longifolius* DC. (*Fl. Fr.*, vi, 311, 1815). Other synonymous names are *P. macrophyllus* Wolfg. in Roem. et Schultes, *Mantissa*, iii, 358, 1827; *P. longifolius* Gay in Lamarck, *Encycl. mét. Bot.*, 535, 1816, and *P. lucens* L., var. *longifolius* (Gay) Cham. et Schlecht. in *Linnaea*, ii, 198, 1827. It is not the *P. longifolius* Bab. in *E.B.S.*, t. 2847, 1840. This is the Lough Corrib plant (1835) not refound, the *P. Babingtonii* Ar. Benn. in *Journ. Bot.*, 204-5, 1894 (*P. lucens* × *praelongus*). Below will be found an account of another plant × *P. decipiens* Nolte, var. *longifolius* Hagstr., gathered at the same time in the same place. Such an opportunity for comparison and contrast so seldom occurs that I propose to adopt this invaluable method of describing both plants in some detail, alluding to *P. lucens* L., var. *longifolius* DC., as the *former*, and to × *P. decipiens* Nolte, var. *longifolius* Hagstr., as the *latter*. As their names imply, both possess very long leaves—up to 9 in. (22.8 cm.) or more in length—and both exhibit some or all of the characters of *P. lucens*. In the absence of fruit the leaf-bases and margins, together with the venation, afford the best diagnostic characters and need very careful examination. The use of a good microscope is essential for the study of the leaf-margins and it is necessary to remember that all their minute projections are easily abraded by the constant friction between the leaves caused by any river current. They are, therefore, often absent from the older leaves but may always be found on the young leaves, especially those at the stem or branch tips. Normally the leaves of *P. lucens* show fine forward-pointing serrulations and between each pair there is a shallow and long concave sinus suggesting the curve of a horse's back with a serrulation at the forward end taking the curve of the animal's neck. This character is well shown in the former and occasionally found in the latter. In *P. perfoliatus* the marginal projections are smaller—denticulations rather than serrulations—are more erect (patent) and less forwardly-directed, less numerous and have between them a straight line of the marginal cells. These denticulations may be found in varying degree on the youngest leaves of the latter, often together with some of the *lucens* serrulations already described. As a rule no lens magnification is needed for an examination of the venation. It will usually be sufficient to hold a leaf up to the light and to look through it. Between the principal longitudinal veins and the short transverse veins joining them are what I have termed 'nerve-spaces'—the larger of which are roughly oblong in form, much longer than broad. These oblongs are best shown in the latter (*decipiens*) plant and run longitudinally, parallel to the midrib, and are in that direction often very long (infl. of *perfoliatus*). In the former (*lucens*) plant these oblongs run transversely at an angle of 60°-75° to the midrib, somewhat like the branches of a tree. This character of the nervation has hitherto received little attention but is of very considerable diagnostic value. The leaf-bases of these two very similar plants are quite different. In the former they are the normal leaf-bases of *P. lucens*, narrowed, neither rounded nor amplexicaul but very shortly petiolate, or often apparently subsessile owing to the decurrent lamina. In the latter (*decipiens*) plant the leaf-bases are rounded, sessile and ± amplexicaul, through the greater influence of *perfoliatus*. As regards length, there is little to choose between the two plants. The largest leaves of the former measured 23.5 × 3.0 cm. and 23.8 × 3.7 cm. Those of the latter were 21.2 × 2.4 cm. and 21.7 × 2.0 cm. In neither case were the leaves fully grown at this early date, May 21, 1934."—PEARSALL.

Potamogeton lucens L., var. *longifolius* DC. R. Avon, near Sopley, S. Hants, May 21, 1934.—W. H. PEARSALL.

×*Potamogeton decipiens* Nolte, var. *longifolius* Hagstr., f. *upsaliensis* (Tis.) Hagstr. Det. W. H. PEARSALL. R. Avon, Sopley, S. Hants, v.-c. 11, August 26, 1934. (Ref. No. 1066A).—P. M. HALL. "×*P. decipiens* Nolte, var. *longifolius* Hagstr., f. *upsaliensis* (Tis.) Hagstr. (=*P. upsaliensis* Tis., f. *genuinus* Tis. Potamog. suec. exs. nos 79-80). This very distinctive form was first gathered in Britain by Miss Ida Roper in June 1916 from a millpond near Wool, Dorset, and queried as '*P. lucens* f.' (see *Journ. Bot.*, 348, 1917). In May 1917 it was collected by the late Dr G. C. Druce at Bindon, Dorset (*Rep. B.E.C.*, 252, 1917). In both cases the plants were determined by the late Mr Arth. Bennett. On May 5, 1934, Mr P. M. Hall and I collected further plants for distribution from the R. Avon near Sopley, S. Hants. The nomenclature of this particular form of the hybrid ×*P. decipiens* Nolte (*P. lucens* × *perfoliatus*) is very involved and the correct citation of the name is therefore a matter of some importance. It cannot be cited as var. *upsaliensis* Tis. (cf. *L.C.*, 1954c) as Tiselius included several different forms under his *P. upsaliensis* Tis. and we are here only concerned with one of them, f. *genuinus*. Moreover, there was already in existence a var. *upsaliensis* Asch. et Gr. (*Synops. Mitteleurop. Fl.*, i, 332, 1897) based upon the same *P. upsaliensis* Tiselius but wrongly given (*l.c.*) as a variety of another hybrid, *P. lucens* × *praelongus*. The simplest and most unequivocal citation would be *P. upsaliensis* Tis., f. *genuinus* Tis. (as above), but that would hide the fact that the plant is the hybrid *P. lucens* × *perfoliatus* and it is agreed that all the varying forms of this should be included under the common name of ×*P. decipiens*—as all the forms of the hybrid *P. gramineus* × *perfoliatus* are included under ×*P. nitens*. The citation given at the head of this note, although cumbrous, is unambiguous and definitely bases the name upon two well-known exsiccata. A further reason for not retaining var. *upsaliensis* Tis. is that Ascherson and Graebner in their more recent work (*Synops.*, ii, 506, 1913) still wrongly include it under *P. praelongus* × *lucens*—which is known only from Denmark and possesses leaves with smooth margins (infl. of *P. praelongus*). The British plant is unquestionably a form of the hybrid *P. decipiens* (*P. lucens* × *perfoliatus*)—the R. Avon plants of *P. lucens*, var. *longifolius* × *perfoliatus*, with both of which they were growing. The evidence for *P. lucens* is seen in the longer leaves—twice the length of any *P. perfoliatus* can show—the presence of fine marginal serrulations (in addition to the more minute denticles of *perfoliatus*) on many of the leaves and often an acuminate apex. The evidence for *P. perfoliatus* is even stronger, the rounded, sessile, ± amplexicaul leaf-bases, the minute marginal denticulations and the lighter-coloured parallel principal longitudinal veins, usually readily visible to the unaided vision."—PEARSALL. "No trace of any flowering or fruiting spikes were found on any visit, and the plant appears to be completely barren."—HALL.

Potamogeton pusillus L., det. W. H. PEARSALL. Canal, Odiham, N. Hants, v.-c. 12, July 8, 1934. (Ref. No. 1215).—P. M. HALL.

Potamogeton pusillus L., var. *tenuissimus* M. & K., det. W. H. PEARSALL. Pond in grounds of Botleigh Grange, Botley, S. Hants, v.-c. 11, August 5, 1934. (Ref. No. 1248).—P. M. HALL.

Potamogeton trichoides Cham. & Schlecht. Hedge Court Mill-pond, Surrey, July 28, 1934. (Ref. F.30).—J. E. LOUSLEY. "Correctly named but gathered too late in the season. Usually this species shows very numerous fruiting spikes but only 2 sheets of this gathering possessed any, and the fruits were few in number. All these very narrow-leaved Potamogetons shed their fruits quickly, and very rapidly turn black. It is extremely difficult to collect them just at the right time, showing green leaves and mature fruits. This species has been known from the same habitat since 1879, and *P. pusillus* also occurs there. In the Stockholm Hbm. is a specimen collected by Beeby which Dr Hagström considered to be the hybrid between these two species. Mr Lousley's plants are *P. trichoides*, and although there are few fruits they are extremely interesting, being quite smooth on their margins. This is the var. *liocarpus* Asch. (*Fl. Prov. Brandenb.* (1864), 665), agreeing with Chamisso's description, figure and specimens in the Berlin Hbm. The more common form, however, possesses warts, bosses or protuberances along its margins in varying degree, and is the var. *tuberculosus* Reichb., *Ic. fl. Germ. Helv.*, vii (1845), 13, t. xxii, f. 35 (*P. condylocarpus* Tausch)—the so-called var. *Trimmeri* Casp. Good fruiting examples of this were sent me this year by Lady Davy from near Weston-super-Mare. The leaves of this species are always 3-nerved, the midrib is very prominent but the two lateral veins are near the margin and very faint, joining the midrib much further from the apex than in the case of *P. pusillus*. There are no parallel lines of lacunae on either side the midrib, and the very acute apex further distinguishes this species." —PEARSALL.

Potamogeton sp. Drain near Mepal, Cambs, August 19, 1934. (Ref. F.40).—J. E. LOUSLEY and E. C. WALLACE. "These are *P. decipiens* Nolte, var. *brevifolius* Hagstr. The sheets have been carefully prepared but are rather uneven, some consisting mainly of the upper stem-leaves and others of the larger and different lower leaves. All the leaves show abundant minute serrulations or denticulations right down their margins. The upper leaves are shortly oblong—ca. 45 × 13 mm.—very rounded—obtuse at the top and shortly but markedly acuminate at the actual apex. They are ± rounded below and sessile but not amplexicaul. The lower leaves are much larger—ca. 115 × 22 mm.—not obtuse, but tapering to a longer acuminate apex more suggestive of *P. lucens*. They are rounded below and occasionally semi-amplexicaul. In the dried state all the stipules appear to be narrow and very acute. As a matter of fact, they were when fresh moderately broad and quite blunt at the apex. Stipules are so extremely thin that when drying commences both their margins curl inwards and the apex—which is shaped like the end of a garden trowel—becomes pointed. Notes on their length, keel (or keels) and apex should be made when taken from the water. In these Mepal plants the influence of *P. lucens* is more in evidence than that of *P. perfoliatus*. It is seen in the uniformly acuminate apex of the leaves, the marginal serrulations, the shape of the lower leaves and their divergent nerve-spaces. That of *P. perfoliatus* is found in the oblong-elliptical upper leaves suddenly and shortly acuminate, the ± rounded bases of all leaves (sometimes half-clasping).

and the irregular disposition of the weakened marginal serrulations."—Pearsall.

Cyperus fuscus L. Breamore, S. Hants, v.-c. 11, August 26, 1934. (Ref. No. 1250).—P. M. Hall.

Eleocharis acicularis R. & S. On damp clay ground (over limestone) where water had stood, Knipe Moor, near Bampton, Westmorland, v.-c. 69, June 27, 1934. Altitude 1090 feet. It was accompanied by *Peplis* and *Littorella*. A new county record.—A. Wilson. "This genus is in future to be spelled *Helcocharis* in accordance with International Rules."—Ed.

Scirpus maritimus L. By pond on Shalford Common, Surrey, v.-c. 17, in abundance, August 11, 1934. A rare species inland, recorded for the adjoining county of Berkshire, see Druce's *Flora of Berks*. There is no trace of this species now at Tville Farm, the station recorded in the *Flora of Surrey*.—E. C. Wallace.

Carex lepidocarpa Tausch. Ribblehead, West Yorks, v.-c. 64, June 29, 1934. (Ref. No. 13).—W. A. Sledge. "Excellent examples of this species as defined by Kükenthal. The stems appear to be quite smooth above in the specimen received by me—hence forma *laevigata* Peterm.—but this form usually grows mixed with "type." In my experience *lepidocarpa* only grows in habitats approaching to very wet fen, and it would be interesting to know if other members' observations agree."—Lousley. "This agrees with specimens named and cited by Kükenthal, and seems to be a rather common English plant. Kükenthal's interpretation of *C. flava* L. is in accord with the 1753 type specimens in the Linnean Herbarium. There are no symbols on the sheet and no notes in Linnaeus' interleaved copies of the *Species Plantarum*, ed. i, nor in the late Mr Daydon Jackson's Catalogue. There are three specimens on the sheet, one of them a complete plant with root. They are 14-20 cm. high, to the top of the male spike; the leaves are 3.2-4.5 mm. wide; the bracts are long and leafy, up to 12 cm. long and 2.5-3 mm. wide; the female spikes are 3, congested, or the lowest separated by an interval of 1.8 cm.; the fruits are upwards from 4.5 mm. long, the beak being 1.5 mm. to nearly 2 mm. long; the male spike is more or less sessile above the females. Such a plant is well-marked in Scandinavia and in Central Europe, but seems—from the evidence of the Kew Herbarium—to be rare in this country and to occur chiefly in the north. Dr Sledge's plant from Roundsea Wood, Haverthwaite, N. Lancs (see *B.E.C.*, *1930 Rep.*, 529, 1931) is surely to be placed under it. Meanwhile, the relations of this typical *flava* to *lepidocarpa* and other segregates still await investigation."—Ed.

Carex extensa Good. Berrow salt-marsh, N. Somerset, October 10, 1934. Much extended in quantity since 1932. Stems up to 3 ft. high.—H. S. Thompson.

Carex montana L. On the cliffs at Carbis Bay, West Cornwall, v.-c. 1, June 13, 1934. New to v.-c. 1, and only recorded from v.-c. 2 from one station on the strength of a specimen in Herb. Arthur Bennett. —J. E. LOUSLEY. "Correct."—NELMES.

Carex diversicolor Crantz. By pond on Denge Beach, East Kent, v.-c. 15, June 3, 1934. My excuse for sending this species (which is variable) is that the female spikelets seem unusually long and tapering. —E. C. WALLACE.

Carex rariflora Sm. Boggy slopes on the Tolmount, alt. c. 1000 m., S. Aberdeen, v.-c. 92. Frequent on the tableland from the Glas Maol to Lochnagar, July 12, 1934.—E. C. WALLACE "Correct."—NELMES.

Carex Hudsonii Ar. Benn. Large tussock in ditch west of Roydon Fen, East Norfolk, v.-c. 27, June 17, 1934. (Ref. No. 1998).—E. C. WALLACE. "Correct."—NELMES. "Yes, excellent *Hudsonii*, a characteristic and abundant plant of East Anglian fenland."—LOUSLEY.

Carex gracilis Curt. Ditch by Newark Mill, Ripley, Surrey, v.-c. 17, May 25, 1934. (Ref. No. 1999). Some of the riper spikes were gathered a week or so later.—E. C. WALLACE.

Carex aquatilis Wahl. Thicket by the Dee, Braemar, S. Aberdeen, v.-c. 92, July 19, 1934. (Ref. No. 2014).—R. MACKECHNIE; comm. E. C. WALLACE. "Very young, but undoubtedly *aquatilis* and probably similar to the slender riverside form collected by E. S. Marshall at Kingussie (*Rep. B.E.C.*, 591, 1898), which was ultimately described as forma *angustata* by Kükenthal."—LOUSLEY.

Carex elongata L. Very fine in ditch by Newark Mill, Ripley, Surrey, v.-c. 17, May 27, 1934. A well-known Surrey station for this local sedge.—E. C. WALLACE. "Correct."—NELMES.

Carex canescens Lightf., var. *fallax* F. Kurtz. Boggy slopes and streamsides on the Tolmount, alt. c. 1000 m., South Aberdeen, v.-c. 92, July 12, 1934. (Ref. No. 2005). This plant from the tableland of the Aberdeen-Angus border has often been named var. *robustior* Blytt, which it is not. These specimens grew with type *canescens* and *C. echinata*. It will be observed that they bear a resemblance to examples of ×*C. helvola* Blytt.—R. MACKECHNIE and E. C. WALLACE. "The mountain forms of this sedge are extremely difficult and not well defined, but these specimens appear to agree with Marshall's idea of the var. *fallax*, which he stated was the plant depicted in *E.B.*, sub. nom. *alpicola* (*Rep. B.E.C.*, 135, 1911)."—LOUSLEY. "This has not the short fruit of *C. canescens* and its poor variety called '*fallax*.' The long rough-edged beak recalls that of *C. stellulata*: ? *canescens* × *stellulata*, although not identical with the Lawers plant, which has been so identified."—WILMOTT.

×*Carex helvola* Blytt. (*C. canescens* × *Lachenalii*). Bog above Lochan nan Eun, Lochnagar, alt. c. 1100 m., South Aberdeen, v.-c. 92, July 8, 1934. (Ref. 2017). Specimens from the original station may be welcome as this plant does not seem to have been distributed for some years.—R. MACKECHNIE and E. C. WALLACE. "Undoubted and welcome specimens of this rare hybrid. It is a pity the altitude is not stated on the labels as there are several Lochnagar stations for this plant, of which the largest specimens appear to be those from the *higher* altitude (*Rep. B.E.C.*, 246, 1906). There is a specimen in Herb. Kew. which has apparently been passed by Kükenthal, C. B. Clarke, and N. E. Brown, which was collected by Sir W. J. Hooker on 'Ben-y-Mac-Duich,' Grampians, in 1822. This is a considerably earlier 'First evidence for Britain,' than that mentioned in *Comital Flora* or in Bennett's papers. The rather similar plant collected by Druce from Ben Lawers is probably of a different parentage; some of the important notes which have appeared on these two plants being as follows:—*Journ. Linn. Soc.*, xxxiii, p. 458 (1898); *Ann. Scot. Nat. Hist.*, 238, 1909; *Rep. Watson Club*, 315/6, 1924/5; 116, 1906/7; 263, 1909/10; *Trans. Bot. Soc. Edinb.*, 30, 1917; 361, 1886; *Journ. Bot.*, 149, 1886; *Ann. Scot. Nat. Hist.*, 232, 1900."—LOUSLEY. "Correct."—NELMES. "This appears to be sterile and agrees well with some of the ×*C. helvola* from Lochnagar, which is far from uniform in that locality."—WILMOTT.

Carex divulsa Stokes. Ditch in lane, Burdocks, near Strood Green, West Sussex, v.-c. 13, July 29, 1934.—E. C. WALLACE.

Carex diandra Schrank. Swampy margin of pond on Denge Beach, Dungeness, East Kent, v.-c. 15, June 3, 1934.—E. C. WALLACE. "Correct."—NELMES. "Yes, rather more slender examples than I have previously seen from this station. The lower stem is absent from these specimens, which fail to show the characteristic habit."—LOUSLEY.

Carex rupestris All. Dry rocks about the Breakneck Fall, Glen Callater, South Aberdeen, v.-c. 92, July 10, 1934. Fruiting poorly in this well-known station.—E. C. WALLACE. "Correct."—NELMES. "Useful specimens of this shy flowering Arctic-alpine sedge, from the station whence it was first discovered for Britain in 1836."—LOUSLEY.

Panicum frumentaceum (Link). River dredgings, Newport, Isle of Wight, October 1932.—J. W. LONG. "=*Echinochloa colonum*, var. *frumentacea* Ridley (*Panicum frumentaceum* Roxb., 1820, non Salisb., 1796, *Echinochloa frumentacea* Link, *E. crus-galli*, var. *frumentacea* W. F. Wight, *E. crus-galli*, var. *edulis* Hitchc., *Panicum crus-galli*, var. *frumentaceum* Trimen). This cultivated grass has probably been derived from *Echinochloa colonum* (L.) Link, for which reason it is treated as a variety of that species.—HUBBARD.

Spartina stricta (Ait.) Roth. Decoy Point, near Heybridge, Blackwater Estuary, N. Essex, August 4, 1934.—E. C. WALLACE. "Correctly named! Fernald (in *Rhodora*, xviii, 180. 1916) has proposed the name *Spartina maritima* (Curtis) Fernald, based on *Dactylis maritima* Curtis (*Enum. Brit. Gr.*, 4. 1787), for this species. Curtis's publication under *Dactylis* comprised the following:— '2. Maritima. H.43. *Cynosuroides*. R.393. 4. Sea.' H.43 is an abbreviated reference to Hudson, *Fl. Anglica*, ed. 2, p. 43 (1778), where *Dactylis cynosuroides* L. is included as a British plant. Linné's species is based on two distinct elements, 1. N. American (Virginia, Canada), 2. European (Lusitania). There is nothing, however, to show that Curtis was separating one of these as a new species; his name 'maritima' must therefore be treated as a superfluous name for *D. cynosuroides* L. On the other hand, Aiton (*Hort. Kew.*, 103-104. 1789) clearly retained *D. cynosuroides* L. for the N. American plant and described the Lusitanian and British plant as a distinct species, *D. stricta* = *Spartina maritima* Roth."—HUBBARD.

Spartina Townsendii H. & J. Groves. Brightlingsea Creek, Colne Estuary, N. Essex, August 9, 1934.—G. C. BROWN. "Correctly named! An interesting paper by Pierre Senay on *Spartina Townsendii*, with a good bibliography, has appeared in the *Bull. Soc. Bot. France*, vol. lxxxi, 632-643 (1934)."—HUBBARD.

Sorghum Halepense (L.) Pers. Waste ground, Dagenham, Essex, September 29, 1934.—R. MELVILLE.

Alopecurus aequalis Sobol. Coate Water, v.-c. 7, August 21, 1934. Anthers pale yellow turning to bright orange. Some specimens rooting at the nodes—such plants grew in the mud on the lake-margin where there was little opposition. Other plants growing further back amongst denser vegetation assumed a more erect habit.—J. D. GROSE. "Superb examples."—ED.

Polypogon lutosus (Poiret) Hitchcock = × *littoralis* (With.) Sm. Farlington, S. Hants, v.-c. 11, July 9, 1934. (Ref. No. 1231).—P. M. HALL. "Correct."—HUBBARD.

Calamagrostis neglecta Beauv. Near Hockham, West Norfolk, July 7, 1934. (Ref. No. F.21). Although only discovered in Norfolk 21 years ago, this rare grass is now known from about half-a-dozen stations in the county—two stations near Hockham, Shropham Hundreds, Stow Bedon, Nayland Hundreds, and from a locality near Kings Lynn communicated to me by Mr C. E. Hubbard. It thus ranges over a considerable area of country, and it seems remarkable that it was not discovered earlier, especially as capable field botanists are known to have carefully listed the flora of several of the stations. The plants now distributed were obtained from part of Cranberry Rough, which is on the site of Cranberry Mere, partially drained in 1795. Now the drainage of this most delightful little fen is being completed to give work to the unemployed. Unfortunately, it was not possible to make the gathering homogeneous, as five very different forms of the plant were collected from a small area in a very short time. Probably all the plants sent out may be labelled var. *Hookeri* (Syme), which even in Ireland appears to be a very unstable variety. From Norfolk the following have also been recorded:—(1) forma *pilosior* Norman—which is "an even greater development of var. *Hookeri* Syme." (2) var. *interrupta* Wahlb.—Panicles only 7.5 cm. long, glumes 3 mm. long. The widest part of the panicle is only 1 cm. wide. With this var. *parviflora* Ruprecht is perhaps synonomous. (3) var. *pallida* Ruprecht. A colour form of *Hookeri* with slightly longer callus hairs. With this var. *viridis* Torges is probably synonomous. Of these I think I gathered plants which might fairly go to (2) and (3). The five forms I gathered vary as follows:—(a) Width of leaf. (b) Close or spreading panicle. F. Robinson (who discovered the plant) says that the Hockham plant has spreading panicles which after about one day become close appressed to the stem, giving it a brush-like appearance. (c) General colour of the panicles—greater or less development of purple colour. (d) Size of panicle—varying from 5.5 cm. in length to 18 cm., and width from 3 cm. to 6 mm. Although there was no obvious explanation, I should suspect these variations of being mere habitat forms and unworthy of varietal separation. Authorities for the above notes will be found in *Trans. Norf. and Norw. Nats. Soc.*, 1913, 48; 1922, 327; 1927, 481. *Journ. Bot.*, 1915, 281; 1917, 291; 1919, 322; 1928, 26; and *Rep. B.E.C.*, 1926, 140/1; 1914, 172; 1915, 287.—J. E. Lousley. "Yes."—C. E. Hubbard.

Cynodon Dactylon Pers. Sandy waste, near Swansea, July 1934.—Jas. W. Long.

Koeleria gracilis Pers., var. *britannica* Domin, f. *glabriflora* Domin. Hog's Back, Surrey, June 12, 1931.—J. Fraser. "Yes!"—Hubbard.

Poa Chaixii Vill. Plentiful in an orchard, Limpsfield, Surrey, June 3, 1933.—R. W. Robbins.

Glyceria declinata Bréb. Damp bare ground by the Wey, Tilford, Surrey, v.-c. 17, July 22, 1934.—E. C. Wallace. "=*Glyceria plicata* Fr., var. *declinata* (Bréb.) Druce. It seems best to treat *G. declinata* as a variety of *G. plicata*. There is no essential difference in the general structure of their spikelets, whilst the differences in size, etc., may be due to habitat-conditions. Further study of this plant in the field is desirable. *G. plicata*, var. *declinata* is probably not the correct name for this plant when it is placed as a variety of *G. plicata*. Several earlier varietal names will have to be taken into consideration, but it has not been possible to examine authentic material of these."—Hubbard.

Glyceria sp. Egloshayle Marsh, near Wadebridge, East Cornwall, June 20, 1934. (Ref. F.25). The name on the labels was added when I was under the misapprehension that the grass now distributed was similar to the one from Egloshayle Marsh identified as *G. festucaeformis* by the late Dr O. Stapf (see Thurston & Vigurs, *Supplement to Fl. Cornwall*, 1922). This latter plant was collected by Thurston and Rilstone on June 24, 1918, and specimens are to be seen both in Herb. Thurston at Kew, and Herb. Mus. Brit. However, these gatherings consist of extremely young panicles barely out of their sheaths, and probably very different in appearance from that exhibited on maturity. Druce (*Rep. B.E.C.*, 1922, 637, and 1923, 142) was very sceptical about the determination, and the two original collectors have both failed to find the plant again after several searches. In Herb. Thurston there are specimens identical with those now distributed labelled "*distans*" and collected on the same date as the alleged "*festucaeformis*." Possibly these plants are best so named (using "*distans*" in the aggregate sense), but they differ in various important characters (leaves *not* flat, midrib of upper pale extending too near to the apex, etc.). The plant was very caespitose with prostrate flowering spikes, and grew on bare mud on the edge of a tidal runnel. The Puccinellia section of *Glyceria* is clearly in need of careful revision by someone able to watch the changes in the growing plants as they mature. "Marked-down" plants studied this year changed in appearance so greatly in a fortnight that it was difficult to realise that they were really the same roots. The character of presence or absence of runners in *maritima* (relied upon by Crépin, Husnot, etc.) as a basic division of the group has been shown to be dependent on the state of maturity of the salt-marsh (*Journ. Ecology*, 1917). The extent to which the leaves are plane or enrolled may well be dependent on conditions of available non-saline water.—J. E. LOUSLEY. " = *Puccinellia maritima* (Huds.) Parl., forma. (*Atropis maritima* Griseb., *Glyceria maritima* Wahl.). *Puccinellia festucaeformis* Parl. (*Glyceria festucaeformis* Heynh.) is readily distinguished from *P. maritima* by its narrower spikelets, shorter and narrower lemmas. It is confined to the Mediterranean Region, eastwards from Corsica."—HUBBARD.

Festuca rubra L., var. *glaucescens* Hegetschweiler et Heer, fide W. O. Howarth. Middle Holm of Aikoness, Papa Sound, between Westray and Papa Westray, Orkney, Scotland, August 25, 1932. (Ref. No. 4581 A.).—H. HALCRO JOHNSTON.

Equisetum arvense L., var. *alpestre* Wahl. In short grass beside Allt Coire Fionn, Glas Maol, alt. c. 1000 m., S. Aberdeen, v.-c. 92, July 1, 1934. (Ref. 2046). Also seen above Coire Ceanmor in Glen Callater on ground but recently free from snow.—R. MACKECHNIE and E. C. WALLACE. "Excellent and extreme examples of this interesting form, see *Rep. B.E.C.*, 98, 1883, and *Rep. Watson Club*, 417, 1912-13."—LOUSLEY. "Yes. But this is an ecological state rather than a variety."—ALSTON.

Pteridium aquilinum (L.) Kuhn., var. Waste ground, W. Drayton, Middlesex, October 14, 1934.—R. MELVILLE.

CORRECTIONS TO DISTRIBUTOR'S REPORT FOR 1933.

P. 750. *Viola monticola* Jord. In line 5 of paragraph, for " normal " read " vernal."

P. 751. *Viola variata* and *V. lepida*. For Sandridge read Sundridge.

P. 767. *Mentha longifolia* (Opiz) Fraser, var. *dourensis* Fraser. For *longifolia* read *cordifolia.*

P. 773. For *Zostera nana* Roth read *Zostera marina* L., var. *angustifolia* Hornem. " Further experience of *Zostera* in 1934 in Sussex, Hants, and Dorset convinces me that the gathering distributed was *angustifolia.* Both *nana* and *angustifolia* I now find grow at Prinstead. There may be specimens of *nana* in the gathering but I believe now that it was all *angustifolia.* Mr Pearsall's note probably referred to plants of *nana* sent to him previously and not necessarily to the gathering distribution, and should therefore be deleted in reference to that gathering. The blame for the confusion is entirely mine."—P. M. HALL.

18 JUL 1935

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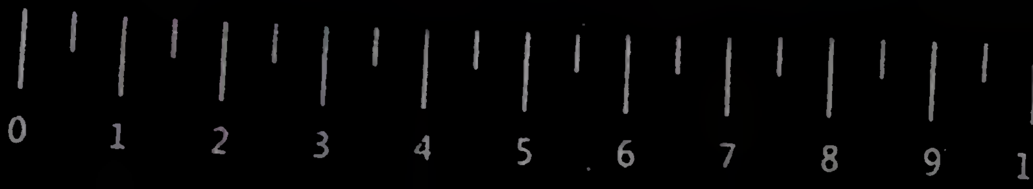
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